
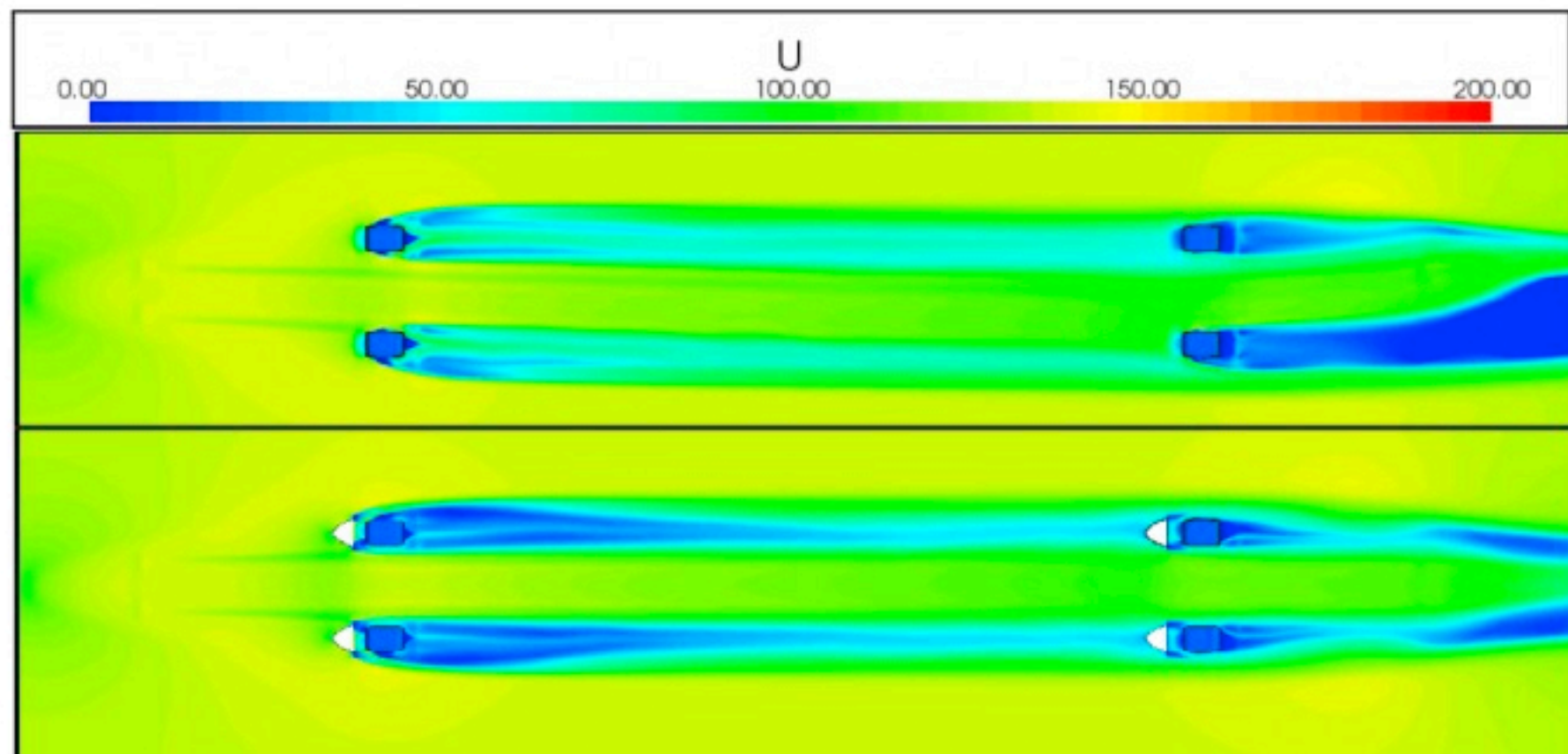


From Sims to Salt, Student-Built EV Targets 400 MPH

By [Keith Barry](#)   August 4, 2011 | 9:00 am | Categories: [Cool Cars](#), [Design](#), [Performance](#)

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After [reaching 307.7 mph on the Bonneville Salt Flats last year](#) with the student-built Buckeye Bullet 2.5, the student engineers at Ohio State University are starting from scratch to build a battery-powered electric vehicle that can break 400 mph. Their work begins in a virtual wind tunnel.

“The third generation electric land speed record vehicle to be designed and built by OSU students, the Buckeye Bullet 3, will be an entirely new car designed and built from the ground up,” said OSU Center for Automotive Research (CAR) director Giorgio Rizzoni. When completed, it’ll be the third unique Buckeye Bullet and feature the team’s fourth powertrain.

Already, the original Buckeye Bullet reached 314 mph with nickel-metal hydride batteries back in 2004, while an all-new Buckeye Bullet 2 hit 303 mph with fuel cell power in September of 2009. Last year, the student engineers swapped a fuel cell for lithium-ion batteries for a [307.7 mph record run](#).

The newest car will feature prismatic lithium-ion batteries from A123 and two electric motors from Monaco’s boutique EV maker Venturi. But perhaps the biggest change will be a new aerodynamic profile designed to eliminate the shock waves that land-based vehicles can create at very high speeds. Those shock waves lead to lift, which can dangerously destabilize the vehicle in addition to slowing it down.

Since physical wind tunnels that simulate 400 mph speeds don’t exist, the team began wind tunnel simulations at the Ohio Supercomputer Center (OSC).

“We’re using computational fluid dynamics (CFD) to design and optimize the vehicle shape,” said project chief engineer Cary Bork, an OSU grad student. “The simulations are needed to accurately predict the aerodynamic forces on the vehicle at these speeds and can only be run on large computing clusters.” One such simulation is shown above.

As a result, the new vehicle will use a unique design that puts the driver ahead of the front tires to conserve volume, reduce vehicle length, cut drag by five percent and improve balance. As shown in the above image, wind deflectors that keep air out of the wheel wells (top) could reduce drag an additional 14.9 percent when compared to a vehicle without deflectors installed (bottom).

If all goes according to schedule, the team will be out of the lab and back at Bonneville by the fall of 2012.

Image: Ohio State University