Honda's solar-electric, trans-Australia record holder is a car

DRIVING THE DREAM

Tight fit: The driving position is reclining.

BY STUART F. BROWN

This is like driving a snare drum, if such a thing can be imagined. Pavement irregularities snap, thump, and resonate through the aircraft-type carbon-fiber chassis. Covered with opalescent solar cells, the one-piece top shell contributes to the boom box effect.

My spin in the Honda Dream solar racer occurred under safe yet stimulating conditions on the 7.5-mile oval loop at the company's test facility in California's windy Mojave desert, where F-16 fighter pilots from nearby Edwards Air Force Base sometimes amuse themselves by flying the course at low altitudes. Rare and endangered desert tortoises make occasional appearances too.

Tall people don't get the chance to pilot this machine; there isn't enough room. Tumbling my 68-inch-tall self into the cockpit's molded curves, though, I found ample space to recline. Feet settle into a concave pocket at the nose, while hands explore the controls. Steering is through a pair of motorcycle-style handlebars, with a right-hand thumb control for *go* and a left-hand brake lever for *stop*. That's it. Drum-type brakes were selected over disc brakes because they fit neatly inside the front wheel hubs, lowering wind resistance.

Up from behind come crew members carrying the upper shell. As they lower it into place, the impression dawns that the Dream feels like a garment. On goes the canopy and it becomes more of a suit of armor, lonely inside. The outside view is through a smile-shaped metallized windshield. Communication with the outside world is via walkie-talkie.

Racing rules requiring a view to the rear are satisfied by a tiny tail-mounted video camera that displays on a compact color TV screen in the cockpit. "It doesn't work very well," observes the disarmingly forthright team leader, Takahiro Iwata.

Honda began researching electric vehicles five years ago, deciding in early 1990 that solar car racing was the way to learn quickly by doing. A group of 20 engineers at the company's research and development center in Tochigi, Japan, was selected. The car to beat: the General Motors Sunraycer, which absolutely ran away with the first 1,880-mile World Solar Challenge held in Australia in 1987.

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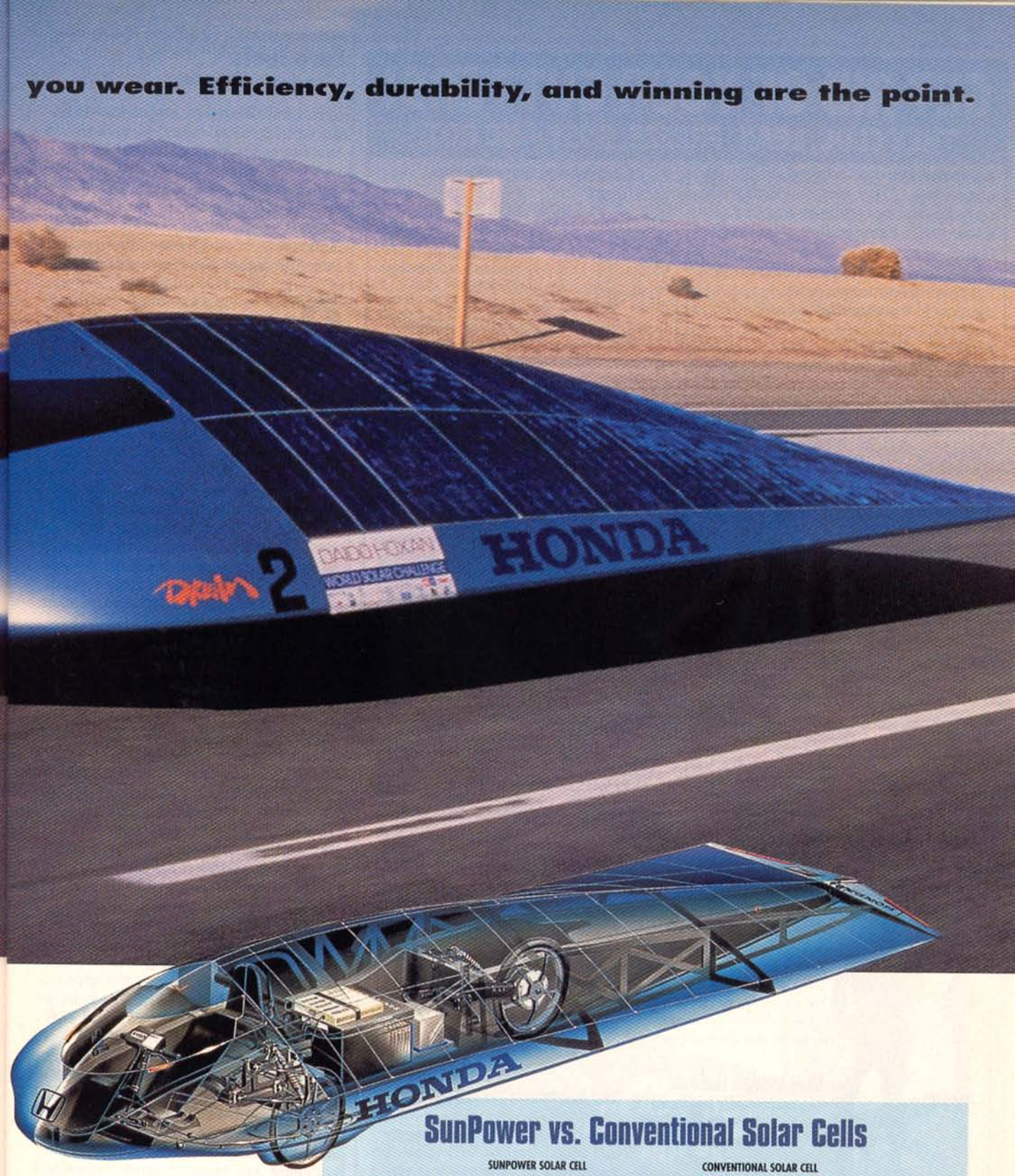
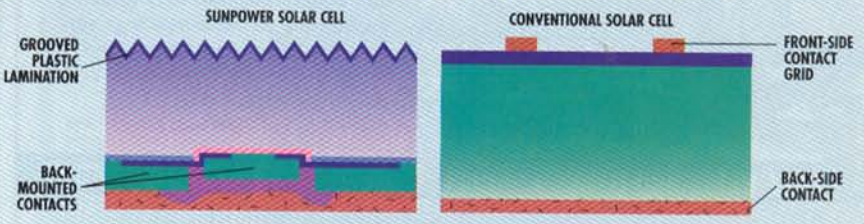


SunPower vs. Conventional Solar Cells



SunPower's 21.6-percent-efficient solar cells are designed with their electrical contacts on the back, where they block less light. Honda added a grooved plastic lamination that increases energy collection at low sun angles. Conventional cells have electrical contacts on the front side.

NADINA SIMON

Driving the Dream

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"We had only seven or eight months to make the car, and we had no idea how we would do it," recalls Iwata. "We studied many types of cars and came to a conclusion that was very close to the Sunraycer. It was the one solution. The Sunraycer was a very good teacher for us, and I respect it very much." Eking out better electrical efficiency and reductions in aerodynamic drag and rolling resistance would be the keys to higher performance.

Honda's original Dream finished second in 1990. "That's OK. It was an amateur team," Honda's president told Iwata. Then he asked, "Did you learn how to win?" The group went to work on a second-generation Dream for the 1993 race ["Automotive Newfront" April '94]. Looking around the world for the best solar cells, Iwata chose a new design with record-breaking efficiency, developed by Sun-Power Corp. in Sunnyvale, Calif.

The hand-built, 410-pound solar racer cost unrevealed millions of dollars to develop and fabricate. "Please take care of this car," Iwata asked me.

My right thumb pushes the power lever. A slight whine emanates from the rear-mounted powertrain as the three-wheeled Dream gradually accelerates. As promised, the steering is extremely sensitive, with only slight movements required to keep the car on a chosen line. Speed builds to 50, 60, 65 mph. Then comes a crosswind and a tail-wagging yaw oscillation begins. Optimized for minimum drag, the body shell generates zero downforce, making the car light-footed. I back off a bit on the power. At this speed, 85 percent of the Dream's work is overcoming drag. The rest is rolling resistance, mostly in the tires and wheel bearings.

This is what engineers call a point design. Efficiency, durability, and winning are the point—not the driver's comfort or peace of mind. Flat out, the Dream can reach more than 80 mph, but no, thank you, in these winds. When a small tumbleweed rolls in front of me, there's no question that calmly running it over is the right thing to do; emergency lane-change maneuvers just aren't an option. Coming around the backstretch, I'm glad when a coyote standing on the pavement trots off into the brush. Like the rear-view TV, the brakes are more or less a formality. Plan way ahead, and keep it pointed.

Convinced that more speed can be squeezed from the sun, Honda plans to race again in 1996. Iwata feels that advances inspired by solar racing will lead within two or three decades to a solar-assisted system for electric-drive passenger cars. PS