Tesla making gains on Model S

Just as **Tesla**'s 1000th production vehicle—Roadster and Roadster Sport models—rolled off the line, the San Carlos, CA-based electric-car manufacturer has firmly entrenched itself in development of its second production vehicle, the Model S, which was shown for the first time in prototype form at January's North American International Auto Show in Detroit, MI.

Unlike the two-seat Roadster, the Model S was designed to seat five adults, plus two children in rear-facing child seats. The Model S will share some of the same features as the Roadster, including the powertrain—a 375-V ac electric motor and single-speed gearbox—and lithium-ion charging structure; however, the additional packaging freedom afforded by the Model S' larger dimensions allowed engineers to re-evaluate the placement of components.

In the Model S, the motor will be mounted horizontally, in contrast to the Roadster's vertical orientation, and the batteries will run flat beneath the floor of the vehicle, as opposed to being stored in a large box behind the seats as in the Roadster. These modifications have also aided in the vehicle's driving dynamics.

"With the battery and the motor being mounted so low in the vehicle, the center of gravity is going to be incredible, which is really going to give the car unrivaled type handling," said Zak Edson, Director, Product Planning, Tesla.

With its larger size and weight, it was considered important to add extra cooling efficiency when developing the Model S.

"Currently in the Roadster, the battery is liquid-cooled, but the electronics and the motor are air-cooled," Edson said. "In the Model S, the motor and electronics will both be liquid-cooled. It allows you to produce a higher constant current without everything getting too hot."

The interior of the Model S features a 17-in infotainment touch screen with 3G/4G wireless connectivity.

The Tesla Model S was designed to seat five adults, plus two children in rear-facing child seats, and features a 60:40 flat-folding rear seat for stowing large objects and a second trunk under the hood.

Capability has also been added to the Model S to handle a 480-V charge in case commercial power stations become available in the future. A 480-V charge cuts charging time to around 45 min, compared with conventional 120- or 240-V outlets typically taking 3 to 5 h.

The interior of the Model S, shown for the first time at the Detroit Auto Show, features a 17-in infotainment touch screen with 3G/4G wireless connectivity. Considered to be the largest on the market "by a good margin," according to Edson, the touch screen enables passengers to download applications and access real-time traffic and weather data.

Tesla is working with a component supplier for the hardware but developing the majority of the touch screen internally to fit the console's unique shape.

"The technologies exist but nothing that's in that size with automotive-grade durability," Edson said. "It needs to be able to withstand the temperature extremes."

The Model S shown at NAIAS is one of two running prototypes. The vehicle is currently undergoing component testing, with full-vehicle testing to follow, and production is expected to begin in early 2012.

"We learned a lot with the Roadster, so now it's more about packaging everything and getting it all compliant," Edson said. "It's really the integration that's the biggest challenge. We have people that are experts in these areas; it's now a question of bringing it all together, doing all the required testing, and then getting it ready to approve."

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