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Q&A with the Maserati Quattroporte's product development manager

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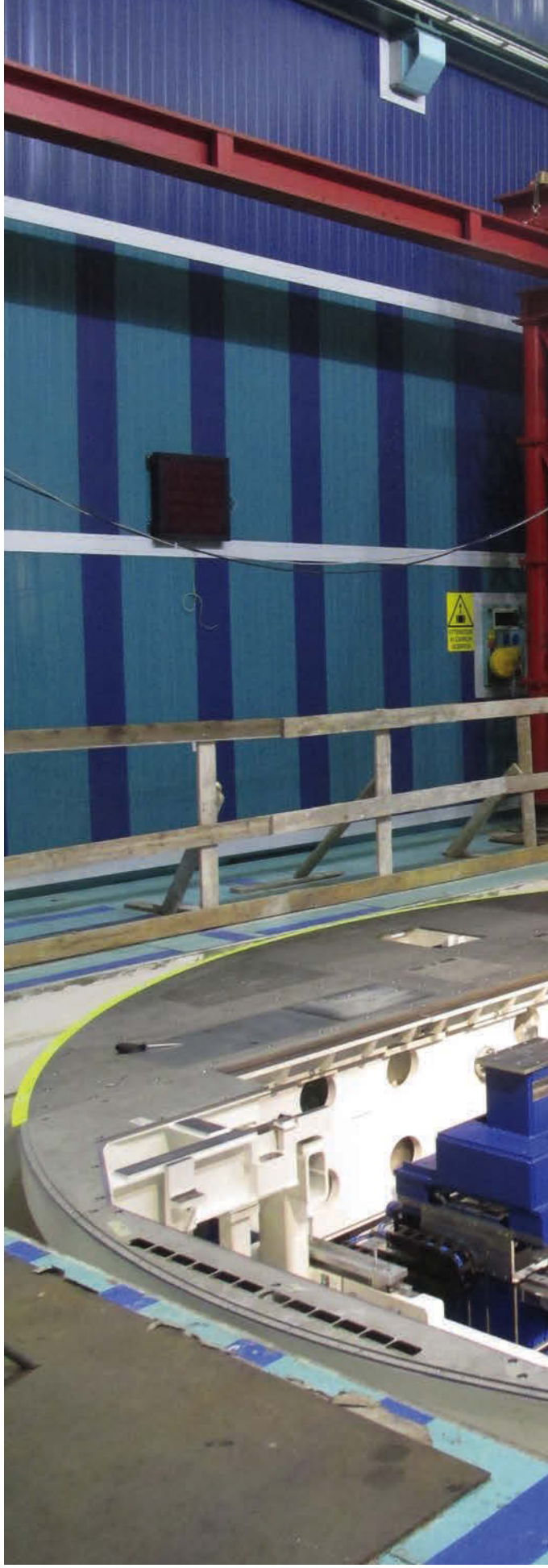
We tour Fiat's upgraded rolling road aerothermal facility at Orbassano, Italy

# Roll model

A new state-of-the-art rolling road system has been installed in the wind tunnel at Fiat's R&D center. We take an exclusive tour of the facility in Turin

**WORDS BY RACHEL EVANS**

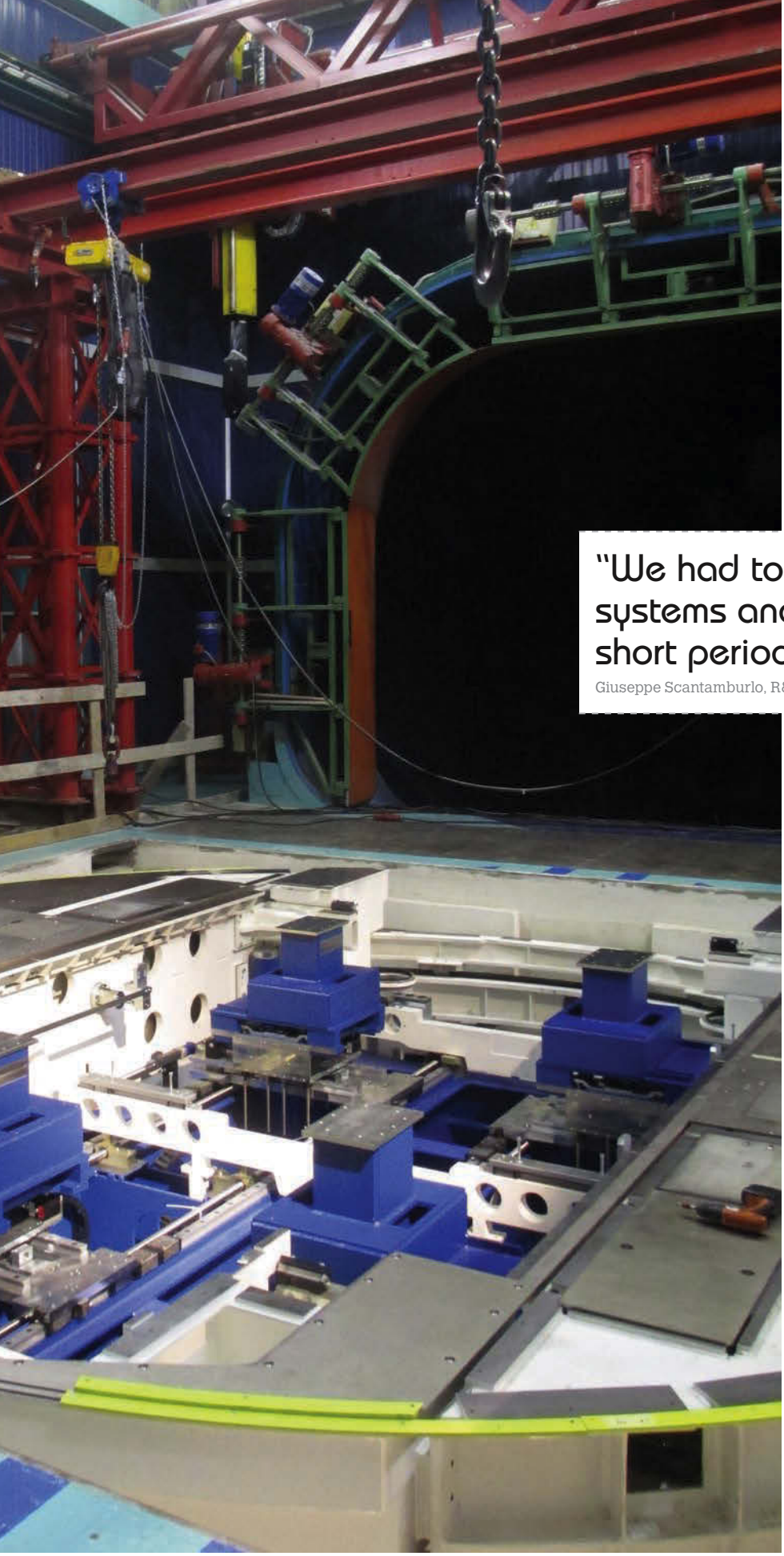


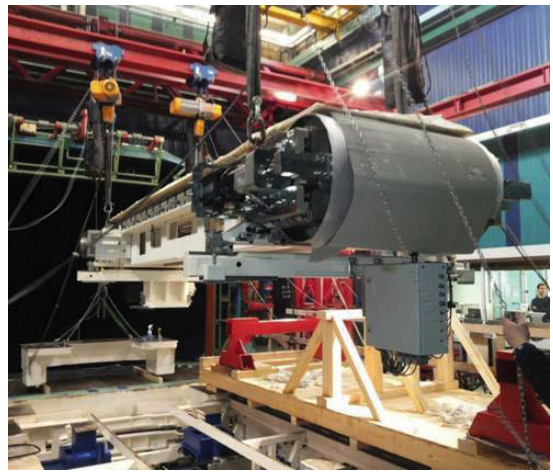
MAIN: Installation of the new rolling road (INSET, OPPOSITE) inside the full-scale wind tunnel

Situated 6 miles (9km) south of Fiat's headquarters in Mirafiori, Italy, is its Orbassano FCA Safety Center and its aerothermal R&D facility. The center in Turin covers 220,000m² and supports Fiat's other R&D facilities in Betim, Brazil and Shanghai, China. It's home to more than 200 engineers and research analysts working across the various departments.

The aero department, which has two wind tunnels – a 25% scale model tunnel and a full-scale aeroacoustic tunnel – is located in a building adjacent to the safety center. Aero development for all Fiat-Chrysler and Maserati vehicles takes place here, with some of the work being carried out at the recently merged group's Chrysler facility in Auburn Hills, Michigan. "We've shared testing and virtual procedures to converge on common best practices that enable us to face future aero challenges," says Giuseppe Scantamburlo, who is responsible for aerothermal vehicle integration and validation at the Orbassano center.

A rolling road was recently installed in the full-scale tunnel and will further enhance Fiat's aero development. Scantamburlo says, "We decided to purchase the system so we could achieve better aero optimization of the underbody and wheel housing, which means we will be able to meet much more challenging [fuel efficiency] targets. The new rolling road will enable us to reduce drag by approximately 10% on all vehicles."





> "We had to completely change all the systems and recalibrate them in a very short period of time"
>
> Giuseppe Scantamburlo, R&D, vehicle integration and validation – aerothermal, FGA

Installation for the system, which was supplied by Horiba, took place over a number of months and was completed in February 2014. The task presented some particular challenges, as Scantamburlo explains: "We had to completely change all the systems and recalibrate them in a very short period of time. We had to enlarge the hole to place a new balance and the rolling system."

Fiat hasn't yet had any interest from external parties such as race teams, although Scantamburlo doesn't exclude the possibility. He also says, "Our technical collaborations with Ferrari will continue and I expect to see them here more so now that the rolling road has been installed."

The closed-loop, full-scale aeroacoustic tunnel operates with a fan measuring 9m in diameter with an exit duct of 30m$^2$, producing wind speeds of up to 215km/h. The test section measures 16 x 12 x 10.5m and is insulated against background noise. The whole facility is controlled by a system that was developed in collaboration with Jacobs Technology.

The tunnel is also equipped with the necessary noise evaluation equipment, enabling the team to perform external and internal evaluations of its vehicles, as well as sunroof buffeting, flow field measurements, and spider and cabrio comfort evaluation. Around 50 microphones for measuring external noise were installed in 2001 and are supplied by PCB. Coupled with this, there are five head dummies for internal noise evaluation.

There's also a Dantec Dynamics laser doppler velocimetry (LDV) anemometer, which has a high spatial resolution and can perform unsteady measurements up to 7.5Hz. It allows for 3D measurement of velocity and turbulence, and calculation of backflow. A smoke machine completes the inventory.