

# Renault Mégane III scored 5 stars at EuroNCAP with the help of Virtual Performance Solution

Featuring  
PAM-CRASH

## THE CHALLENGE

- Launch a vehicle with same comfort and safety standards but with a reduced production cost and a lighter Body-in-White
- Reduce CO<sub>2</sub> emissions
- Use fewer physical prototypes than for Mégane II in order to meet financial and planning objectives

## THE STORY

*“Simulation is key to our project development process. PAM-CRASH allows us to identify not only the behavior of standard vehicle definition but also the probability to improve our crash performance and to build virtually every element that has an impact on our decision-making.”*

Eric Duguet,  
CAE Body-in-White Manager,  
Renault Group.

## THE BENEFITS

- Save costs and time in the development process by decreasing the number of real prototypes needed for physical tests
- Get highly accurate results especially for strength, scattering and distortion effect
- Reduce overall CO<sub>2</sub> emissions while keeping the same standard of vehicle robustness
- Simulate the entire car with Finite Elements (FE) modeling

The Renault Group is one of the largest automakers in the world. Designing and producing their own car models since 1898, Renault is renowned worldwide for its innovations in terms of design, safety, motor racing and electrical cars.

## EXCELLING IN INNOVATIVE AND SUCCESSFUL CAR DESIGN

Renault started using Virtual Performance Solution with PAM-CRASH in 2001 for structural crash simulation. Over the past few years, several Renault car models such as the Laguna III and the Scenic were validated by simulation with PAM-CRASH and obtained excellent results, both scoring five stars at the EuroNCAP test.

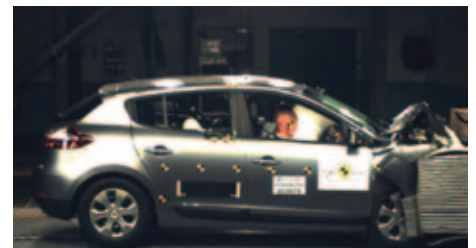
The new Renault Mégane (also known as Mégane III) was not an exception to the rule. Renault was committed to earning the best possible score for this car model, as the Mégane is a flagship vehicle line. Following the huge commercial success of Mégane II, Renault decided to refresh the Mégane line, with a new look and design, while enforcing the comfort and safety standards the original model is known for.

Mégane III was launched in November 2009 in Europe, with a new design, and enhanced key features.

## OUTSTANDING RESULTS AT EURONCAP CRASH TEST

In line with Renault's vision, the Mégane III scored 37/37 points and was awarded five stars at EuroNCAP crash test. The highest rating was granted for frontal crash testing, in part thanks to prior simulation results obtained with PAM-CRASH.

This high score for Mégane III is a turning point for Renault as they are the only automaker to have ever earned eleven times five stars at the EuroNCAP.



Mégane III front crash simulation and EuroNCAP test

Renault relied on virtual prototyping to validate the design of the Mégane III car model, before testing any physical prototypes. Virtual Performance tests with PAM-CRASH spanned Body-in-White modeling, structural crash analysis, as well as spotweld modeling. These also included safety simulation with PAM-SAFE, ESI's occupant safety analysis application within Virtual Performance Solution, such as airbags release, belt pretensioners and occupant behavior under load cases. These safety simulations led to the development of the “SRP3”: the Third-generation Renault System for Restraint and Protection (*Système Renault de Protection de Troisième Génération*). The “SRP3” adapts the way protection equipment reacts according to the violence of impact during a crash.

# MAKING THE MOST OF SIMULATION TO ENGINEER A NEW CAR DESIGN

One important aspect Renault worked on during the development phase of Mégane III was the decrease of CO<sub>2</sub> emissions. In order to achieve this, they had to build a lighter Body-in-White. By optimizing the steel parts of the Body-in-White, they successfully contributed to reducing the weight of the Mégane III, decreasing the overall CO<sub>2</sub> expense and keeping the same standard of vehicle robustness.

Another target was to reduce the number of physical prototypes in comparison to the Mégane II, thereby saving in development costs. For this purpose, Renault leveraged virtual prototyping and obtained very accurate results. They evaluated especially the manufacturing tolerance of the Body-in-White which can change slightly between the virtual and the physical prototype. Thus, they used PAM-CRASH to define the different material behavior and got the model strength, scattering and distortion effects which allowed them to have a final robust car design.

New projects are currently on-going and Renault continues to use Virtual Performance Solution, with PAM-CRASH and PAM-SAFE, as reference simulation tools respectively for structural crash analysis and occupant safety.



Mégane III lateral crash simulation and EuroNCAP test

*“PAM-CRASH is a **tailored solution** fully adapted to Renault’s problematic especially during the development of the Mégane III.”*

Eric Duguet, CAE Body-in-White Manager, Renault Group

To find out more about ESI’s Virtual Performance Solution, visit: [www.esi-group.com/virtual-performance-solution](http://www.esi-group.com/virtual-performance-solution)

## ABOUT RENAULT

Renault S.A. (Euronext: RNO) is a French automaker producing cars, vans, buses, tractors, and trucks. The strategic alliance with the Japanese automaker Nissan in 1999, makes currently Renault the world’s fourth largest automaker. Established in 1898 by the Renault brothers, the company is well-known for numerous revolutionary designs, security technologies and motor racing. Headquartered in Boulogne-Billancourt, France, Renault also owns the Romanian automaker Automobile Dacia and the Korean automaker Renault Samsung Motors. Renault vehicles are distributed worldwide, especially in Europe, Middle-East and Africa, South-America and Asia. For further information, visit [www.renault.com](http://www.renault.com)

## ABOUT ESI GROUP

ESI is a pioneer and world-leading provider in virtual prototyping that take into account the physics of materials. ESI has developed an extensive suite of coherent, industry-oriented applications to realistically simulate a product’s behavior during testing, to fine-tune manufacturing processes in accordance with desired product performance, and to evaluate the environment’s impact on performance. ESI’s solutions fit into a single collaborative and open environment for End-to-End Virtual Prototyping, thus eliminating the need for physical prototypes during product development. The company employs over 750 high-level specialists worldwide covering more than 30 countries. ESI Group is listed in compartment C of NYSE Euronext Paris. For further information, visit [www.esi-group.com](http://www.esi-group.com).



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