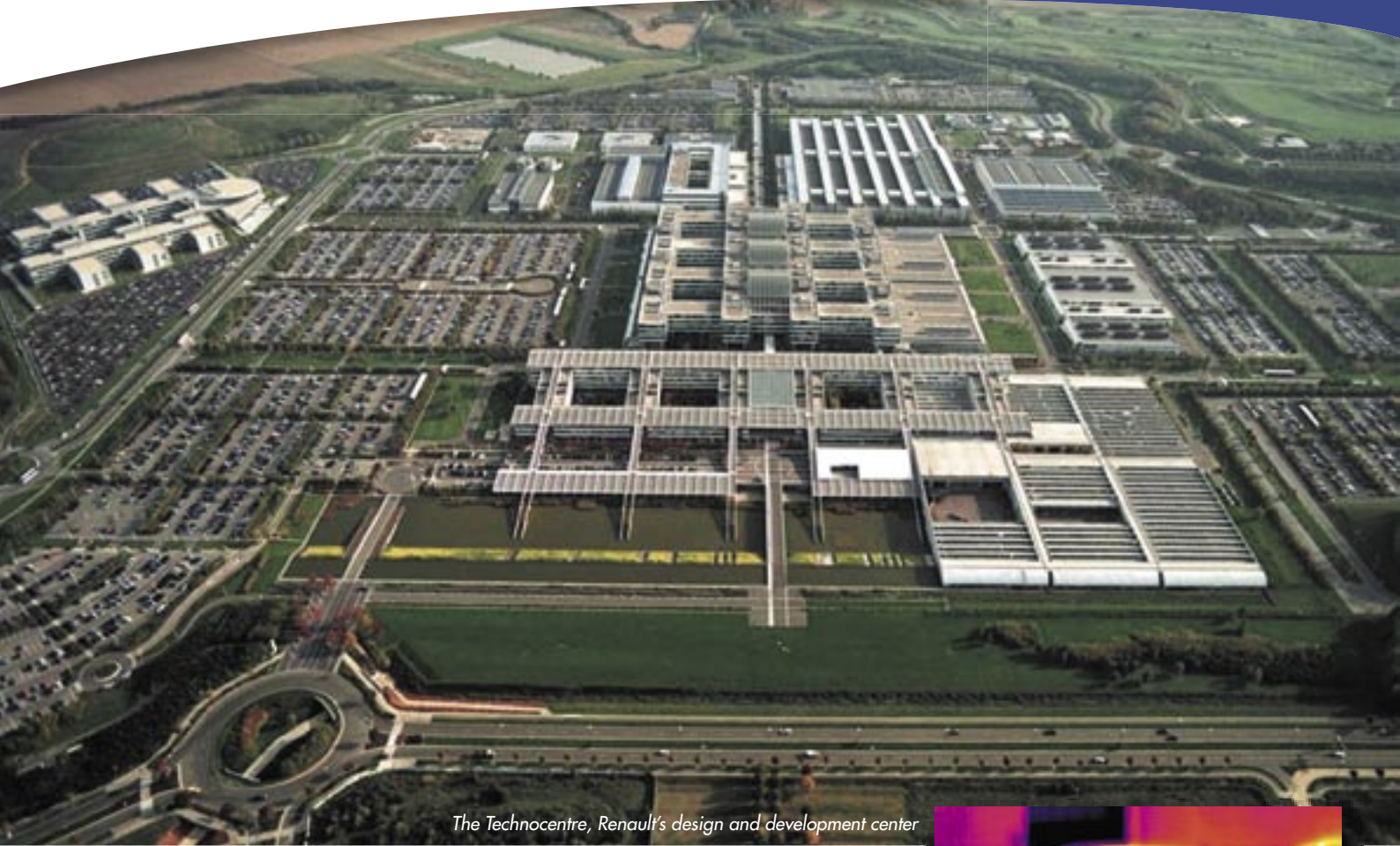


# FLIR

## APPLICATION STORY



*The Technocentre, Renault's design and development center*

## Creating Automobiles: FLIR Systems ThermoCAM S65 intensively used at Renault Research and Development Centre

Car manufacturer Renault has a knack for innovations: the company, founded by the Renault brothers in 1898, has invented the turbocharger, the cardan shaft, modern style spark plugs, and last but not least, the European compact van car model. Its "Technocentre", a 150-hectare product development and innovation temple on the outskirts of Paris, houses some 12,000 employees, as well as FLIR Systems ThermoCAM camera systems.

### ASSESSING MATERIAL QUALITY

Renault's Material Engineering Department consists of some 400 engineers and technicians. They are responsible for the validation of all parts and components which are used for car assembling. These materials, whether steel, plastics or other, are subjected

to elaborate testing and analysis prior to or purchase and production. The Material Engineering Department also analyzes parts and components of cars crashed in an accident. Thermography in general, and a FLIR Systems ThermoCAM S65 in particular, plays an important role in the material validation process.

### OPTIMIZING PROCESSES

For its latest series of Modus, Clio, Mégane, Laguna, and Espace car models, Renault has designed and developed fenders made from a plastic component as they substantially reduce weight and corrosion. These fenders are formed by injection moulding. The equal distribution of temperatures and uniform cooling, a precondition to a stable quality of



# FLIR



these large and geometrically specific parts, proved to be a challenge. As the fenders coming out of the mould cool down rather slowly, and their emissivity remain at a steady 0.9, the infrared camera could be used to visualize the cooling process right after the molding. This way, the camera visualized problems which were not taken into account by the modeling of the fenders, in particular at the extremities of the fender. The thermographic evidence enabled the engineers to adjust variables such as flow volume regulation and the mould's cooling cycle, adapting them to the specific, difficult geometric forms of the piece. In addition, the infrared measurements allowed Renault to better assess and calculate the impact of sunlight and sun heat on the fenders. In a particular case, consistent thermographic surveying of the prototypes eventually resulted into a design modification of the fender, saving modeling and wind tunnel costs. Thermal imaging proved itself as a viable and cost effective method to indicate the thermodynamic performance of tooling and to optimize the cooling cycle of complex parts and components for the automotive industry.

#### CHECKING SUPPLIER QUALITY

To secure their stringent quality standards, Renault's material validation experts check all elements of the supply chain. The ThermoCAM S65 is intensively used during visits to suppliers: "Before the company steps into a huge purchase and delivery contract for automobile parts, we examine the supplier's product and manufacturing process as thoroughly as possible", says Jean-Baptiste Blumenfeld, validation technician and infrared camera expert at the Technocentre. "An infrared camera is the perfect instrument to assess the welding quality of plastic parts and components. And the ThermoCAM S65 weight of 2 kg and its easy handling enables us to visit suppliers worldwide and check their product and manufacturing quality on site," he adds.

There seem to be no limits to thermographic material assessment in the automotive sector: at Renault's Technocentre, the infrared camera proved to be instrumental in measuring the

effects of heat and humidity on halogen rear lights.

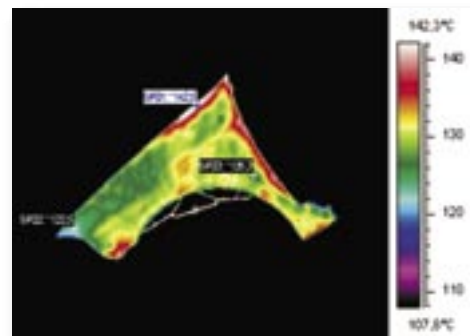
#### RISK ASSESSMENT

At what point do car engines and or exhausts fail or catch fire? Probably not a major concern for a normal driver. However, the ThermoCAM S65 is also intensively used on the engine test bed. New engines are put to trial for heat build-up and distribution, determination of the failure point and in order to examine their running under extreme load conditions. The camera's 50/60 Hz real-time digital recording and video and FireWire connectivity enables detailed and long-term observations, while the ThermoCAM Researcher™ software offers all relevant measurement functions to analyze the results. The camera hardware's ability to both provide visual and infrared imagery and the software's formalizing of operating cycles is valued by engine development engineers. A long way from thermocouples, which are only able to measure temperatures at one particular spot.

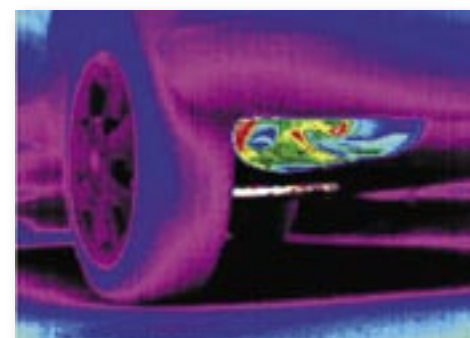
#### SPECIAL TASKS

With over thirty research and validation projects per year, the Technocentre's ThermoCAM S65, equipped with a standard or wide angle lens, is not exactly resting on a shelf. "Either various departments here at the Technocentre request our direct intervention as material validation thermographers, or we actually become part of a project," explains Blumenfeld: "and then there's the ad hoc calls: occasional checks, even at the production line to see if welding seams meet the required criteria." Blumenfeld singles out the camera's bright screen and the .jpg picture format for easy exchange, analysis and storage. All thermographic analysis results are placed on the Technocentre's intranet and made available throughout the entire Renault group. A distinct contribution towards realizing Renault's proud title of "Créateur d'automobiles".

*Thanks to Franck Carette, Regional Sales Manger, FLIR Systems France for providing contacts and support.*



Plastic fenders: ThermoCAM S65 visualizes problem zones at the extremities



Exhaust monitoring

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