

Testing platform in adverse weather conditions



View of the platform track of the Clermont-Ferrand laboratory

The track consists of 2 parts:

- a tunnel, of durable construction
- a greenhouse of lightweight construction, maintained by two arches and covered by two sheets, one black and one transparent (for daytime conditions)

Tunnel characteristics	
Length	15 metres
Width	5.5 metres
Roof clearance	2.6 metres
Greenhouse characteristics	
Length	16 metres
Width	8.5 metres
Clearance under arches	2.4 metres
Measuring equipment	Physical parameters and measuring ranges
Transmissiometers	Meteorological visibility from 5 to 1000 m
Video-photocolorimeter	Luminance from 0.003 to 50000 cd/m ²
Optical granulometer	Particle size from 0.4 to 40 microns
Spectro-pluviometer	Rainfall intensity from 0.001 to 1200 mm/h

A controlled environment for metrological testing

The perceptual and visual skills of human pilots as well as automatic steering and driver assistance systems (laser technologies, lidar, infrared, computer vision) may be heavily modified, if not prone to failure when submitted to adverse weather conditions, mostly fog and rain.

Similar risks of failure can affect information and communications technologies, ICT, involved in the development of Intelligent Transport Systems, ITS, which aim is to improve road-vehicle communication, and to generate real-time information for both user and network operator.

Studies in reduced visibility conditions are difficult to carry out in on-road conditions for obvious safety reasons, but also for scientific matters.

All this implies to carry out tests in a controlled environment, ensuring repeatability of disruptive weather events, in order to quantify the impact in terms of performance loss.

A research infrastructure has been built in the Clermont-Ferrand laboratory belonging to Cerema, French centre for studies and expertise on risks, environment, mobility and urban and country planning.

This platform is used for:

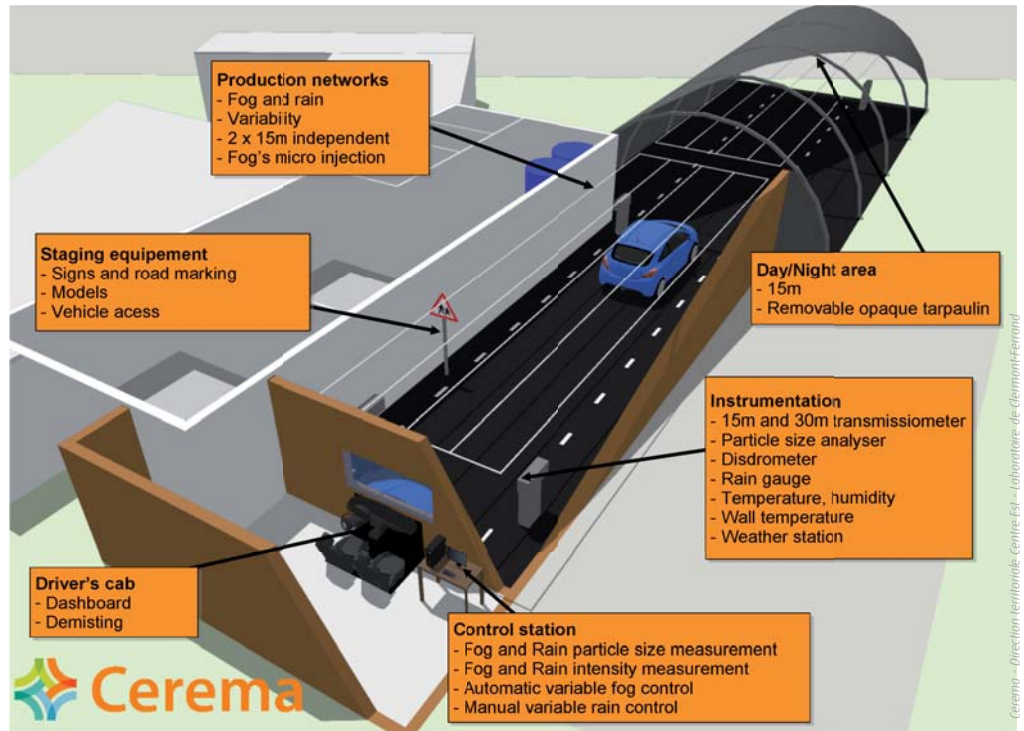
- reproduction and control of fog's particle size, of meteorological visibility, and of rain's particle size and intensity;
- physical characterization of natural and artificial fog and rain.

The laboratory also includes a measuring system in order to quantify the photometric characteristics of various objects (luminance and colorimetry).

The Cerema fog & rain platform, a suitable choice for tests, research and development in adverse weather conditions

The platform is used for various applications:

- methodological development to compare artificial and human vision systems
- development of algorithms for image analysis and processing in adverse weather conditions
- application and development of new imaging technologies in the specific conditions of fog (infrared, laser...)
- performance testing of upcoming advance driver assistance systems (ADAS) including automatic obstacle detection features (lidar)
- study of analysis methods of visual scenes by video photometry
- examination of driver perception in conditions of poor visibility, target detection and readability tests, with focus on context influence.
- performance evaluation of innovative signalling systems



Academic partnerships

Universities: Clermont-Ferrand, Nancy, Lyon, Liège, Glasgow, Riga

French Ministry for Ecology, Sustainable Development and Energy (MEDDE), road directorate for the Massif Central (DIRMC)

Public and private research centres (French Institute of Science and Technology for Transport, Development and Networks - IFSTTAR, Météo-France, National Optics Institute, Canada - INO)

Industrial collaborations

Automotive and aeronautical equipment suppliers

Manufacturers specialized in

- road safety,
- traffic management,
- automatic obstacle detection,
- information and communication technologies (road networks video monitoring)

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The Cerema is a member of IMobS3 Excellence Laboratory
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and the ViaMéca cluster

