

EXPERIMENTAL AND NUMERICAL STUDY OF EJECTION OF DROPLETS FROM A SOLID SURFACE IN A TURBULENT FLOW NEARBY A WALL

Evangelos Bacharoudis, Greece

Supervisor: Prof. J.-M. Buchlin

Promotor: Prof. L. Labraga (Université de Valenciennes, France)

Overspray is characterized by water droplets impacting onto the windscreen of a car from certain parts of the wiper system when it comes back to its park position. This phenomenon is most visible when the driver cleans the windscreen with the washer system. The number of droplet impacts can be significant and bother the driver's sight, and give the feeling of a poor wiping quality.

This complex phenomenon that is dependent on several parameters such as the speed of the car, the speed of wiping, the type of liquid used (water, washer) and type of the wiper arm can be separated in three different steps.

- The first step corresponds to the creation and ejection of the droplets from the wiper system.
- The second step is related with the transport of these droplets and their interaction with the complex flow behind the wiper system which is a result of its unsteady wake, turbulence and the boundary layer of the car.
- Finally, the third step corresponds to the impact of the droplets on the windscreen.

The aim of the study is to understand more deeply the physical mechanism of the phenomena in all these three steps, to predict the behavior of the droplets by means of numerical simulations and in a short time to control the droplets projection by acting on the geometry of the wiper system.

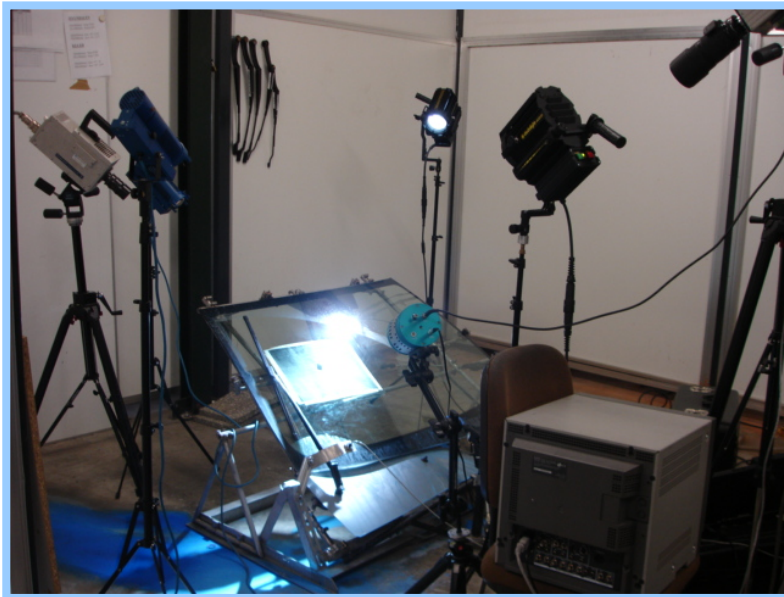


Figure 1: Preliminary tests for camera and light configuration