



Department of Transportation  
Planning and Engineering,  
NTUA



Department of Neurology, Psychiatry  
and Social Medicine, UoA  
Department of Psychology, UoA

# Cognition, Behaviour and Driving

26 June 2015, Athens  
Amphitheater NIMTS



## Investigating driver distraction with driving simulator experiments

**Stéphane ESPIÉ**  
Senior Researcher  
IFSTTAR - France



**IFSTTAR**



Athens, 26 June 2015

# Driving simulators

## 3 main usages

1. Vehicle design (car manufacturers, OEM, ...)
2. Training / retraining (motor schools, ...)
3. Study / understanding of drivers' behaviour (research institute, ...)

## various drivers

- Professional testers that use the simulator as a tool
- Random drivers that are trained / studied using the simulator

## one question

- How to transfer results acquired in virtual situations to real situations?



## Simulating driving

1. To reproduce the physics of the phenomena?
    - Difficulties / impossibility to render physics (motion, visual dynamics, sounds, ...)
  2. To reproduce the complexity of the various interactions?
    - Complexity of the car and of the car / road interactions
    - Complexity to model/simulate sensors (radar, lidar...) in real time
    - Complexity to model/simulate the road users' behaviours and interactions
    - ...
  3. To provide simulator' drivers with driving illusion?
    - Based on the production of acceptable situations / stimuli recognized by drivers
      - Difficulties to produce « realistic » (and coherent) motion feeling
      - Difficulties to produce “realistic” and complex driving situations
      - Simulator sickness syndrome, ...
- driving simulation is still topic of research



# Driving simulators



## Pro / cons (bias)

1. Cost / reproducibility compare to on road equivalents, but what about complexity of the simulated road situations
  2. Limits in road situations design
  3. Objectively safe situations vs subjectively safe situations
  4. Simulator sickness
  5. Validity / transferability of the acquired data
- need for careful experiment design and operation, need for pre-experiments and for iterative tuning phases

