

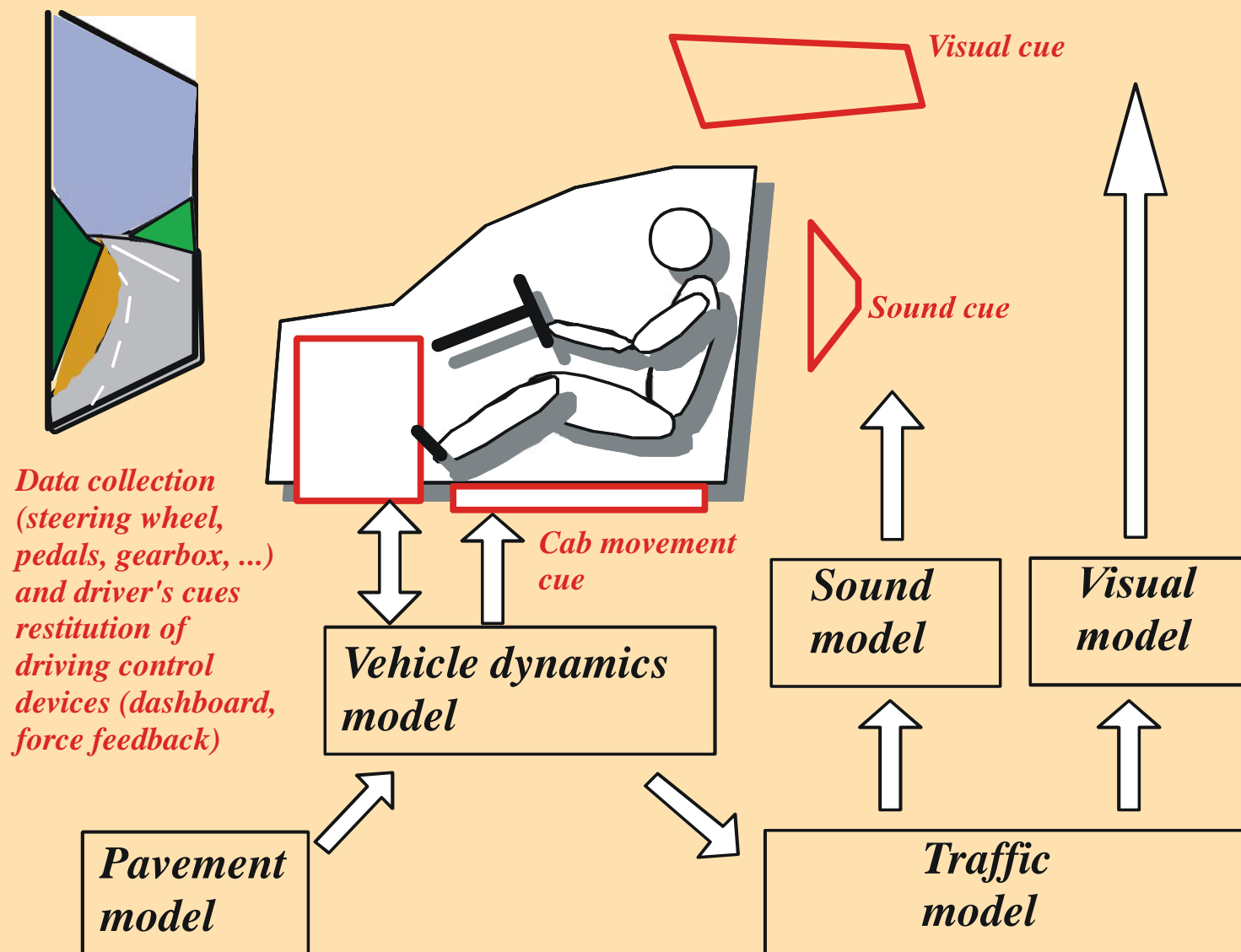
TRAINING NOVICE DRIVER: TOWARD COGNITIVE TRAINING

S. ESPIÉ / INRETS - MSIS

MOTIVES

- Numerous accidents during few years just after the license
 - The novice driver "discover" new situations, does not adequately recognize the situations and thus, does not adequately anticipate (inadequate adaptation of the behaviour)
- Limits of the driving simulators
 - Impossibility of rendering the physics of the phenomena
 - Complexity of the simulation of complex and “realistic” traffic situations (underlying driver model)
 - Cost (for complex architecture) vs cost of a real vehicle

SIMULATOR ARCHITECTURE EXAMPLE (MSIS-SIM²)



DRIVING SIMULATORS LIMITS: SUMMARY

PHYSICS VS ILLUSION

- Impossibility to render physics...
 - Kinaesthetic: acceleration and braking
 - Visual: resolution, luminance (contrast), colorimetry
 - ...Possibility to give illusion...
 - Vection (visual): self movement illusion
 - Tilt (kinaesthetic): acceleration illusion
 - Story (cognitive): situation illusion
 - ...
- Problem of inconsistent perceptions... simulator sickness

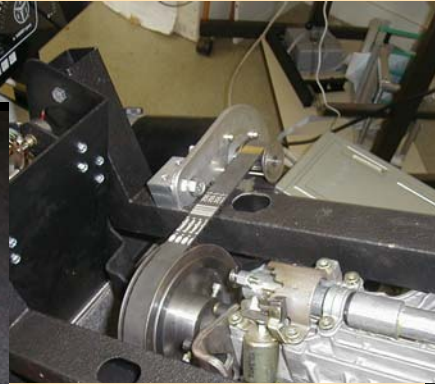
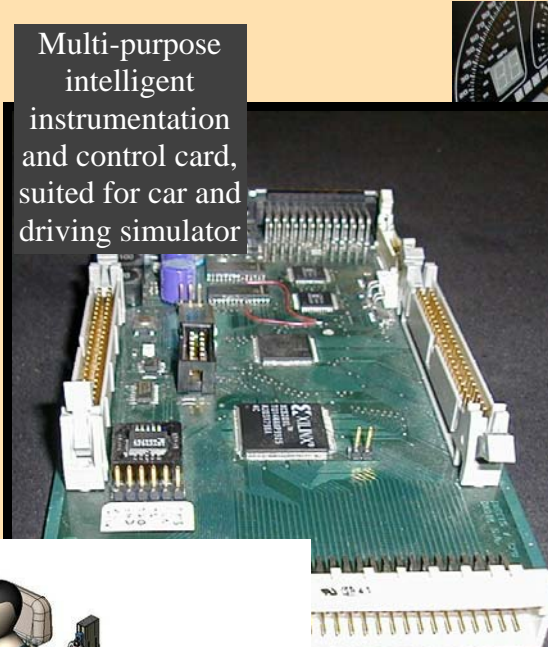
DRIVING SIMULATORS ARE STILL TOPICS OF RESEARCH...



. EXAMPLE OF MOTION PLATFORM : NADS

Haptic force feedback

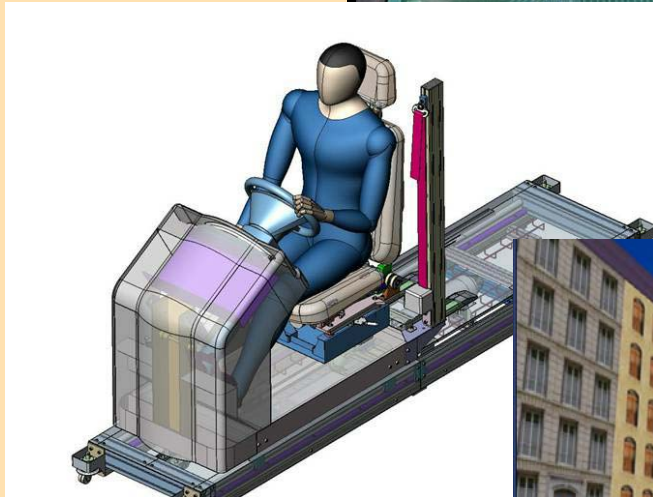
Multi-purpose intelligent instrumentation and control card, suited for car and driving simulator



INRETS-FAROS mini simulator for research



Motion base prototype



**MSIS
simulator
research
projects**



Scenarios authoring language and behavioural traffic simulation model



Poor visibility situation: VOIR Project

SIMULATING “REALISTIC” TRAFFIC SITUATIONS

- Training time is limited
 - All the traffic situations are not encountered
- Normative behaviours vs practices
 - Current training focus on normative behaviour while traffic situations are based on practices
 - Extrapolation (anticipation) from a situation by novice drivers can be false, and lead to incidentogeneous situation
- A simulation tool (simulator + assisted replay) allowing to train novices drivers to recognize and anticipate properly “complex”, “non normative” traffic situations will be probably usefull
 - Cost has to be low (to allow the novice driver to acquire “sufficient” experience)
 - Traffic situations must be “realistic” and can reproduce incidentogeneous situations

REQUIREMENTS

- Low cost
 - The aim of the tool is to teach how to adequately recognize and anticipate a road situation... the aim is not to teach how to master the vehicle
 - “Good” visual rendering is required (pushed by the “game” market the cost of the visual rendering is decreasing while the quality is improving), but there is still some limitations (poor visibility situations...)
 - “Poor” simulator hardware can be sufficient (no motion... only visual?)
- Prospects of research
 - How far can we simplify the hardware while ensuring “acceptable” driving simulation (virtual car control with sufficient “immersion” and without simulator sickness phenomena)?
 - Improvement of visual rendering for ensuring “good” distances of visibility and thus “good” delay for analysing the situation (not only for poor visibility situations)... this is not covered by the “game” market

- Traffic situations

- “Realistic” simulation of non normative behaviours for the various actors of the situations

- “False” behaviour will break the immersion (illusion)

- Simulation has to use psychological fundings on driver’s behaviour in actual situations

- One can use the results of works achieved in accidentology for identifying most common accidents scenarios

- Ambiguity of the behaviours of the others actors, of the road infrastructure...

- Prospects of research

- Model of drivers’ behaviour, traffic simulation, scenarios

- “Realism” and complexity vs reproducibility

- Urban situations involving various road users (pedestrians, 2 wheels...)

- Scenarios and databases including accidentogeneous situations

- Using the fundings from in-depth accident analysis

CONCLUSIONS

- Numerous accidents during few years just after the license
 - The novice driver "discover" new situations, does not adequately recognize the situations and thus, does not adequately anticipate (inadequate adaptation of the behaviour)
- Training time is limited
 - All the traffic situations are not encountered
- Training focus on normative behaviours, not on actual practices
 - Extrapolation (anticipation) from a situation by novice drivers can be false, and lead to incidentogeneous situation
- A simulation tool (simulator + assisted replay) allowing to train novices drivers to recognize and anticipate properly “complex”, “non normative” traffic situations will be probably usefull
 - The ability to exchange standpoints (novice driver vs other road users) is probably a very usefull feature (when used) of the simulation tools