



Interinstitutional Central Psychological Laboratory of Cardinal Stefan Wyszyński University in Warsaw

Head of the ICPL: prof. Jan Terelak

Laboratory of Transport Psychology

Head of the Laboratory: dr Monika M. Małkiewicz

Contact: m.malkiewicz@uksw.edu.pl

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LPT Equipment

- Passenger car simulator,
- Measuring equipment :
 - eye tracking system,
 - monitoring of physiological parameters, i.e. heart rate, skin-galvanic reaction and brain bioelectric activity - EEG),
- Vienna Test System,
- Test2Drive.

Studies conducted in the simulator may include **the impact of various factors**, relevant to road safety, that are associated with:

- **the driver himself** (his experience in driving a car, health condition, psychomotor, cognitive and intellectual abilities as well as personality),
- **road infrastructure** (e.g. signposting, additional elements such as radars or surface type),
- **vehicle** (driver assistance systems, e.g. navigation, cockpit ergonomics and other elements such as a mobile phone).



Our car simulator is a diagnostic and educational tool. It may be used in **testing the psychomotor performance** of drivers in various road conditions. It may be used in **predicting abnormal behavior on the road** and teaching them how to correct it.

LPT Equipment

Opel Astra (real standard car) with

- 6 degrees of freedom motion system generating vibrations with frequencies from 5 to 300 Hz,
- playing sound effects of the actual driving,
- round front screen that covers whole driver's vision (even periferial).
- instend of side and central mirrors there are LCD displays,
- configurable gearbox - manual 6-speed/automatic,
- security systems: ABS, ESP, power steering
- tablet – navigation
- voice communication between the researcher/instructor and driver, camera system.

The simulator is integrated with the monitoring of physiological parameters.



What can we simulate?

Part of a day

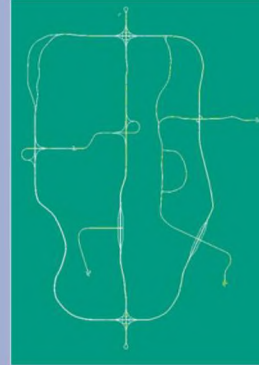


Day



Night

Roads – highway



Weather conditions



Good
visibility



Fog



Rain



Snow

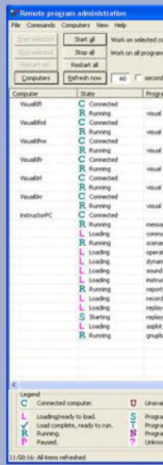
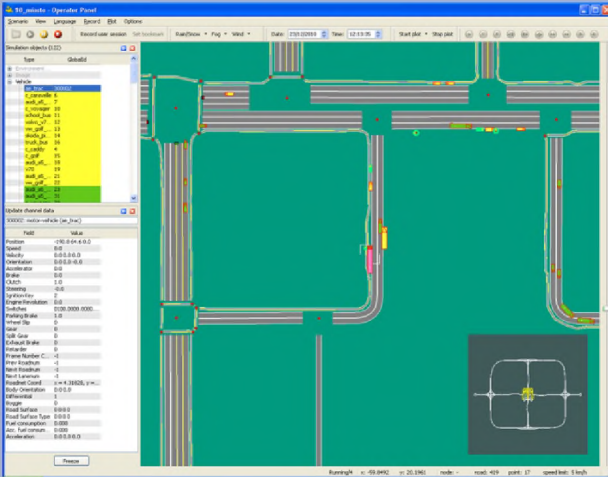
Technical defects

Flat tire

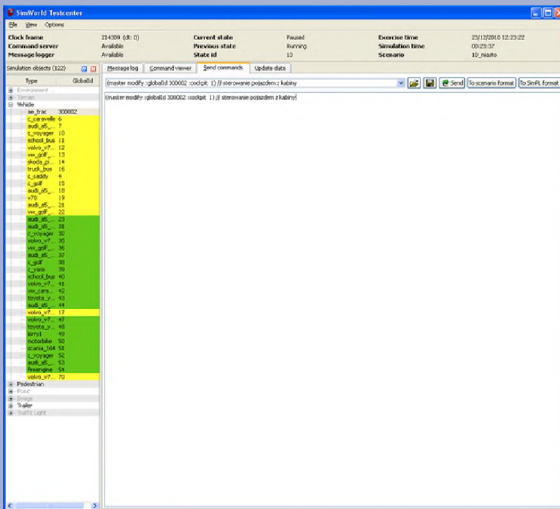


Intrusion of a pedestrian

Operator Panel



Test Center



C:\simworld\cfg\test

```
string command0
string command1
string command2
string command3
string command4
string command5
string command6
string command7
string command8
string command9
string command10
string command11
string command12
string command13
string command14
string command15
string command16
string command17
string command18
```

Remote Admin

C	Komputer jest podłączony do systemu
U	Komputer niedostępny. Możliwa przyczyna: nie jest włączony, nie jest fizycznie połączony z siecią, nie jest na nim uruchomiony program RemoteStart.
L	Program wczytuje scenariusz lub jest co najmniej gotów do rozpoczęcia ładowania
✓	Program wczytał scenariusz i jest gotów aby go uruchomić, oczekuje na sygnał Start
R	Program wykonuje scenariusz
P	Scenariusz został spauzowany (zamrożony).
S	Program jest w trakcie uruchamiania, nie jest gotów do wczytania scenariusza
T	Program kończy pracę
N	Program nie jest uruchomiony
?	Stan programu nie jest znany, najczęstsze przyczyny: komputer nie jest podłączony
E	Błąd programu. Jeden z wątków programu uległ awarii i program nie może kontynuować pracy.

Legend

C Komputer podłączony.

L Wczytywanie/gotów do

✓ Wczytywanie zakończone, gotów

R Praca.

P Wstrzymano.

U Komputer niedostępny.

S Program jest w trakcie

T Program kończy pracę.

N Program nie pracuje.

? Status nieznan.

center.cfg

Test Center

```

(global reset)
(clock setClock :state "exerciseLoading")
(clock setClock :state "ready")
(clock setClock :state "running")
(clock setClock :state "paused")
(observer setObserver :station "station0" :targetId 300002 :position (0 0 100) :orientation (-90 0 0))
(observer setObserver :station "station0" :targetId 300002 :position (0 -20 30) :orientation (-40 0 0))
(observer setObserver :station "station0" :targetId 300002 :predefPos 0) // widok początkowy
(master modify :globalId 300002 :cockpit -1) // sterowanie pojazdem autonomiczne)
(master modify :globalId 300002 :cockpit 0) // sterowanie pojazdem z klawiatury)
(master modify :globalId 300002 :cockpit 1) // sterowanie pojazdem z kabiny)
(master modify :globalId 300002 :puncture "front-right") // przebicie opony przedniej-prawej)
(master modify :globalId 300002 :puncture "front-left") // przebicie opony przedniej-lewej)
(master modify :globalId 300002 :puncture "off") // opony naprawione)
(master modify :globalId 300002 :brakeFailure 0.0 ) // awaria hamulcow)
(master modify :globalId 300002 :brakeFailure 1.0 ) // hamulce sprawne)
(master modify :globalId 300002 :extraLoadPosition (0 0 2.7 1.3) :extraLoad 10000.0) // ładunek 10t)
(master modify :globalId 300002 :extraLoadPosition (0 0 2.7 1.3) :extraLoad 0.0) // ładunek 0t)
(master modify :globalId 300003 :connectToVehicle 300002) // podłączenie przyczepy/naczepy)
    
```

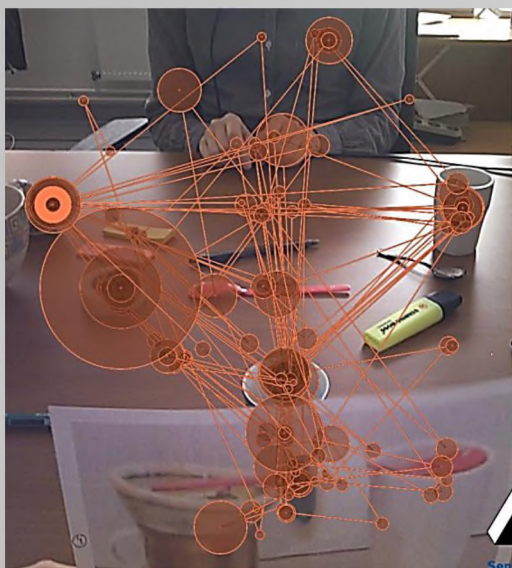



Eyetracking glasses by SensoMotoric Instruments (SMI)

Sampling frequency: 60 Hz.

- It measures: oculomotor activity (only central vision!)
- Enables testing in the natural environment (eg. while driving a car, testing in stores, in public facilities).
- Data collected during the measurement:
 - fixations (position, number f. in a given region),
 - saccades,
 - pupil size,
 - frequency and duration of blinks.

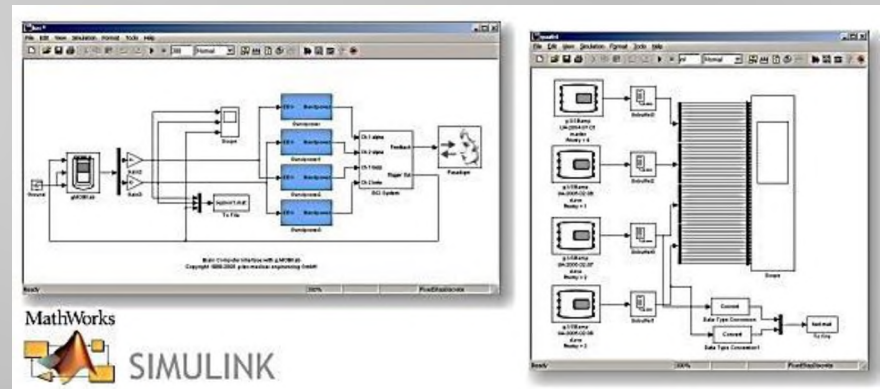




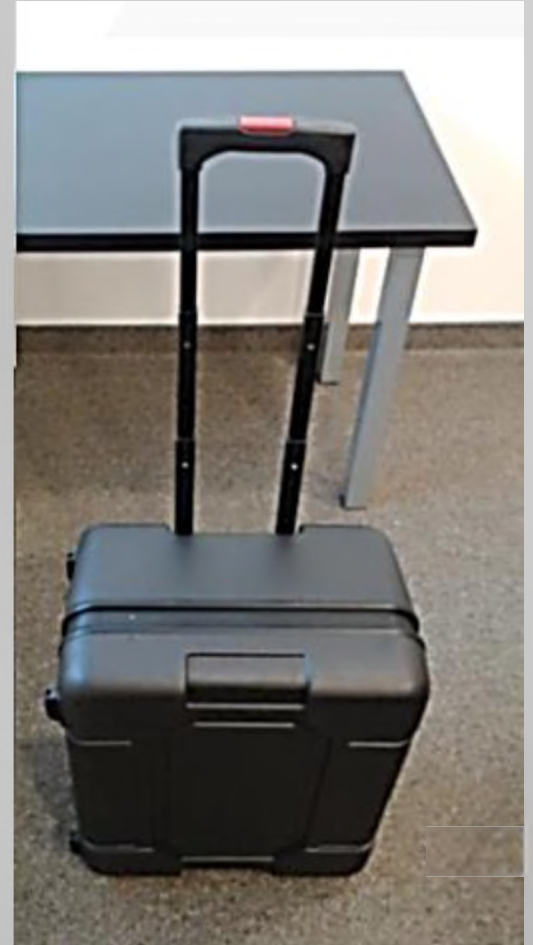
Biological signals amplifier and processing system



- g.USB amp – 16 channel biological signal amplifier; Sampling frequency [38,4 kHz] 512Hz,
- g.GAMMA caps (S, M, L),
- g.LADYbird – set of 10 active electrodes,
- software: g.Hlsys, g.BSAnalyze , Matlab Simulink

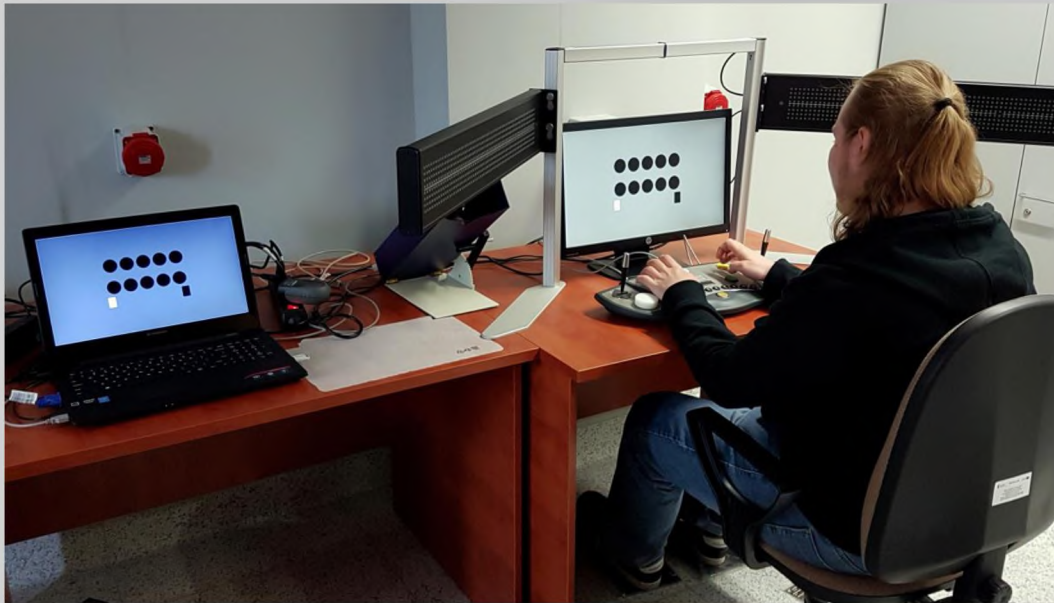


Vienna Test System (mobile)



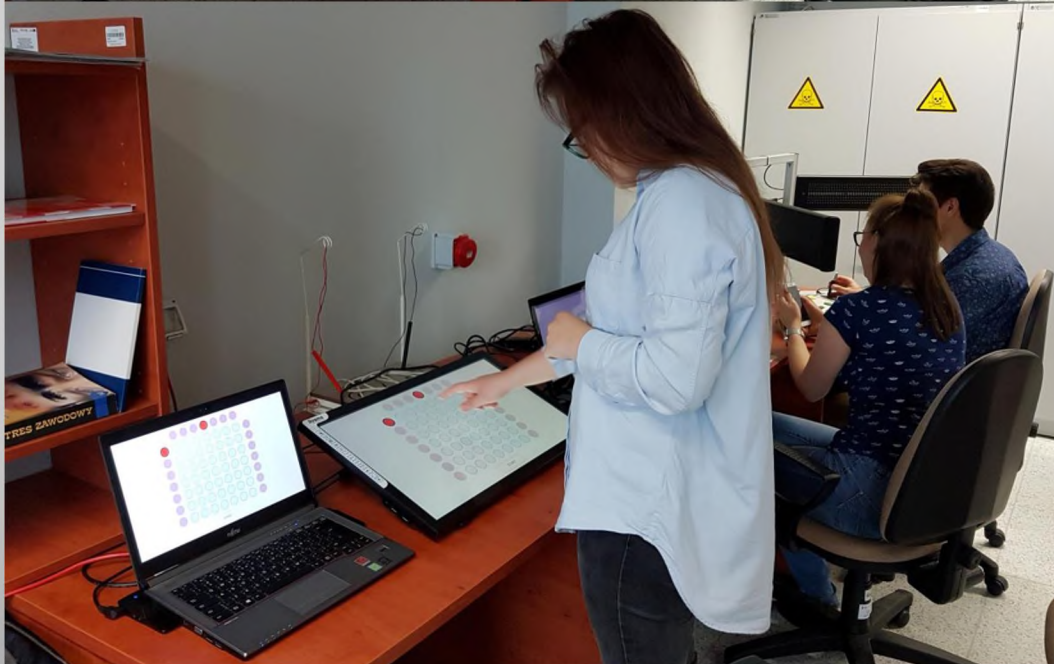
„Test2Drive”





Vienna Test System & Test2Drive

measure fitness to drive
with **special test sets**
that comply with Polish
legal requirements.



What can we measure
using VTS & T2D?

- psychomotor skills;
- cognitive ability,
executive functions,
attention, memory;
- intelligence,
- personality.



**Thank You
for Your Attention!**

j.terelak@uksw.edu.pl

m.malkiewicz@uksw.edu.pl

Facebook: @mm.malkiewicz