



REF Motorway Simulation

CE Class I Medical Device

User manual

Distribution mode

Available for direct download at
<http://virtualisvr.com/espace-client/>
Use under license





Table of contents

1.	GENERAL.....	3
1.1.	Description.....	3
1.2.	Indications.....	3
1.3.	Contraindications.....	3
1.4.	Module field of application.....	3
1.5.	Intended user.....	3
1.6.	Warnings and caution.....	4
1.7.	Hardware and minimum configuration requirements.....	5
1.8.	Required accessories.....	5
2.	SOFTWARE USE.....	6
2.1.	Patient setup.....	6
2.2.	Session settings.....	6
2.2.1.	Presets.....	7
2.2.2.	Settings.....	8
2.2.3.	Weather.....	11
2.3.	Session.....	13
2.4.	Shortcuts.....	14
2.4.1.	Keyboard.....	14
2.4.2.	Xbox controller.....	15
2.4.3.	Thrustmaster steering wheels.....	16
2.5.	Results.....	20
2.6.	Data processing.....	20



1. GENERAL

1.1. Description

MOTORWAY SIMULATION software is an immersive 3D simulation based on virtual reality technology, i.e. it allows a person to be immersed in an artificial digitally created world.

Motorway Simulation is a software used for rehabilitation of the "motorway syndrome" - a disorder occurring when the left and right visual hemifields move at different speeds. This module provides a virtual driving situation: with a steering wheel, pedals (gas pedal, brake) and visual controls (rear-view mirrors).

1.2. Indications

Rehabilitation of scrolling disorders, particularly the "motorway syndrome".

1.3. Contraindications

Epileptic patients, children under 15 years of age, pregnant women.

1.4. Module field of application

This module has been designed for the treatment of the "Motorway Syndrome". This specific form of scrolling syndrome is characterized by several elements, including:

- Occurs with drivers (not the passenger, or only rarely).
- Occurs most often above a certain speed (90 – 100 km/h on average).
- Occurs on open roads, especially 4 lane roads / motorways.

Varied symptoms: often a sensation of deviating to the left or right. Disturbed when overtaking heavy goods vehicles, false impressions of speed variations, etc.

To be differentiated from motion sickness in cars, there is another specific module for it: Car Simulation.

1.5. Intended user



Healthcare professionals: physiotherapists; occupational therapists; neuropsychologists; ENT doctors; neurologists; PMR doctors (physical medicine and rehabilitation), etc.

Research Centers: CNRS, CHU, INSERM, etc.

1.6. Warnings and caution

Immersion in Virtual Reality is a powerful tool, especially for stimuli that can induce sensory conflicts.

WARNING



These stimulations can potentially cause certain disorders: vagal discomfort, epileptic seizures, migraines, vomiting, malaise, dizziness, syncope etc.

This type of re-education must be approached progressively, particularly in Virtual Reality where the stimulation is "powerful".

The contraindications are identical: mainly epilepsy and migraines.

RECOMMENDATION



As postural reactions can be spectacular, we **STRONGLY** recommend that you place the patient in a secure environment and stay close to him/her throughout the session to anticipate any loss of balance or discomfort caused by the use of virtual reality.

RECOMMENDATION



It is also recommended to increase the duration and intensity of stimulation very gradually after an initial short session to ensure the patient's tolerance to this type of stimulation.

Motion sickness is treated by "habituation", so you need to recreate the symptoms experienced during transport.

WARNING



It is essential to stop the session when the first symptoms appear, generally "sweating".

Define a working area of about 3m² to allow for risk-free movements.

Take a 10-to-15-minute break every 30 minutes of use.



It would be counterproductive to take into account the fact that some motivated patients may wish to go further. It's up to the professional to "dose" immersion so as not to provoke neurovegetative symptoms. This type of symptom can intensify in the hour following the session.

Nor can Virtualis be held responsible for any disturbances suffered by patients during or use of their software.

The accessories required to use the software may emit radio waves that can interfere with the operation of nearby electronic devices. If you have a pacemaker or other implanted medical device, do not use the product until you have taken advice from your doctor or the manufacturer of your medical device.



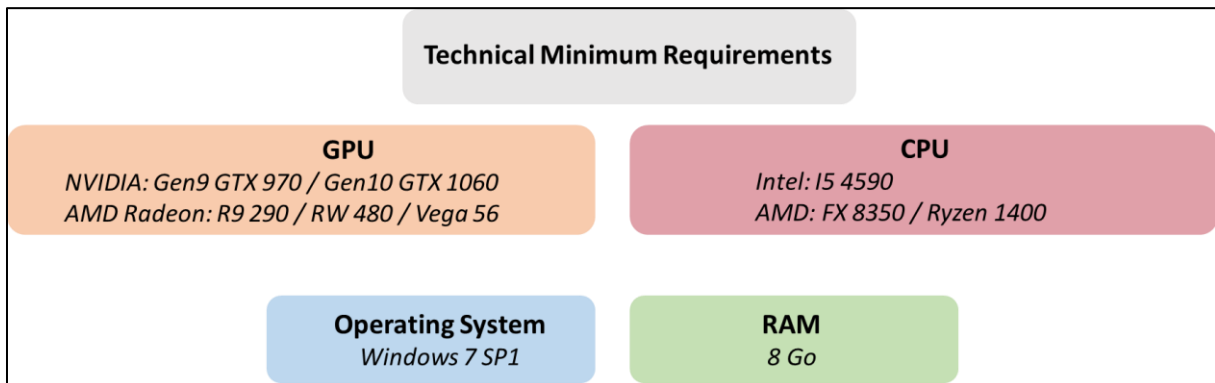
Any serious incident should be notified in writing to qualite@virtualisvr.com

1.7. Hardware and minimum configuration requirements

Hardware required to use the system:

- VR Ready PC
- VR System: HTC VIVE, HTC VIVE Pro or compatible system
- Lighthouse bases (HTC VIVE tracking)

In order to install and use our virtual reality applications, we recommend a configuration equal to or higher than the system requirements:



1.8. Required accessories

VR headset and Xbox controller or steering wheel and pedals kit.



2. SOFTWARE USE

2.1. Patient setup



RECOMMENDATION

It is strongly recommended to acquire the steering wheel / pedals kit (references on our website purchase guide) to place patients in triggering conditions.

It is common to reproduce their discomfort when driving with a steering wheel, it is much more difficult with the Xbox controller (which also allows for less features than the steering wheel).

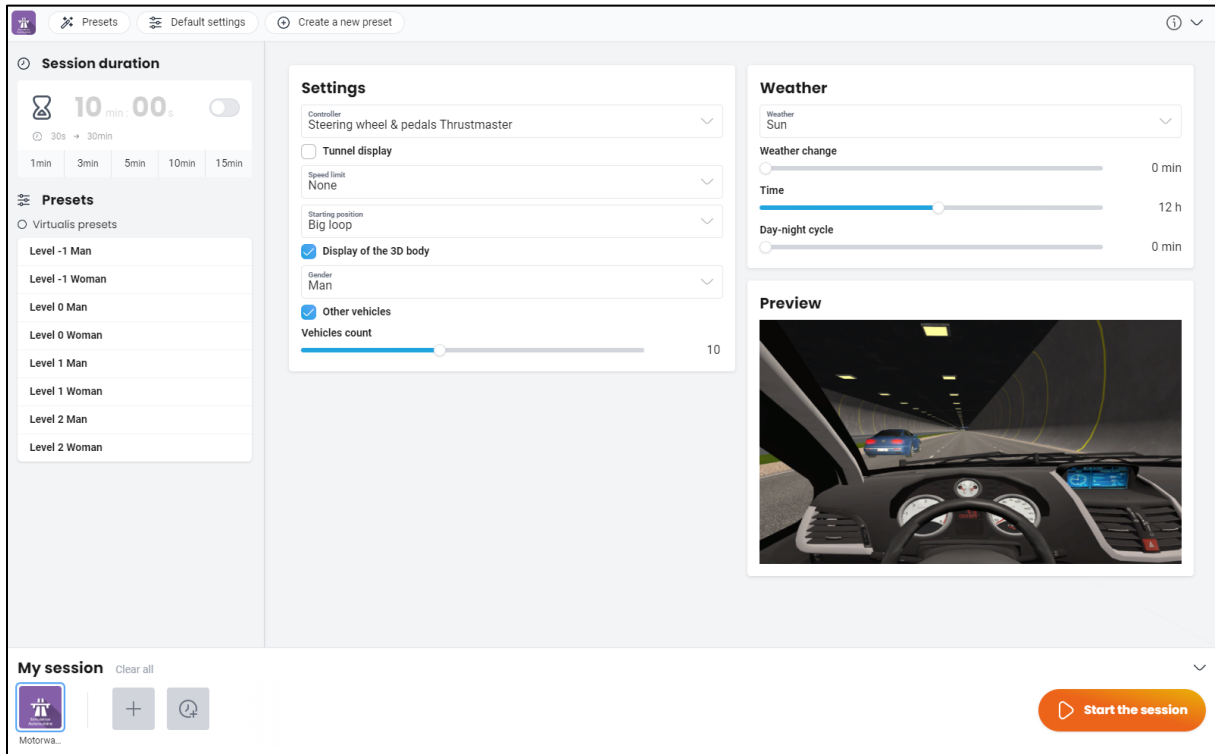
The patient is seated, with hands on the steering wheel and feet on the pedals.



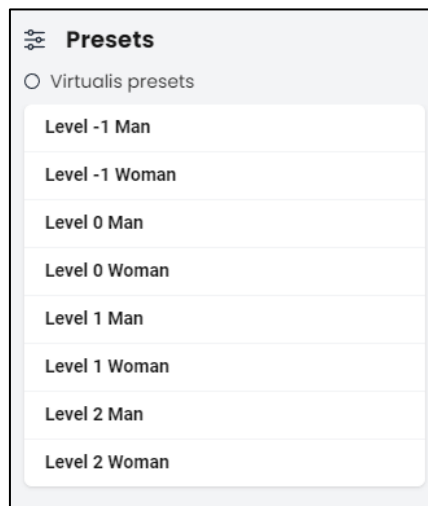
RECOMMENDATION

The psychological / phobic aspect that develops in these patients needs to be taken into account and requires to "put them back in the conditions" gradually.

2.2. Session settings



2.2.1. Presets



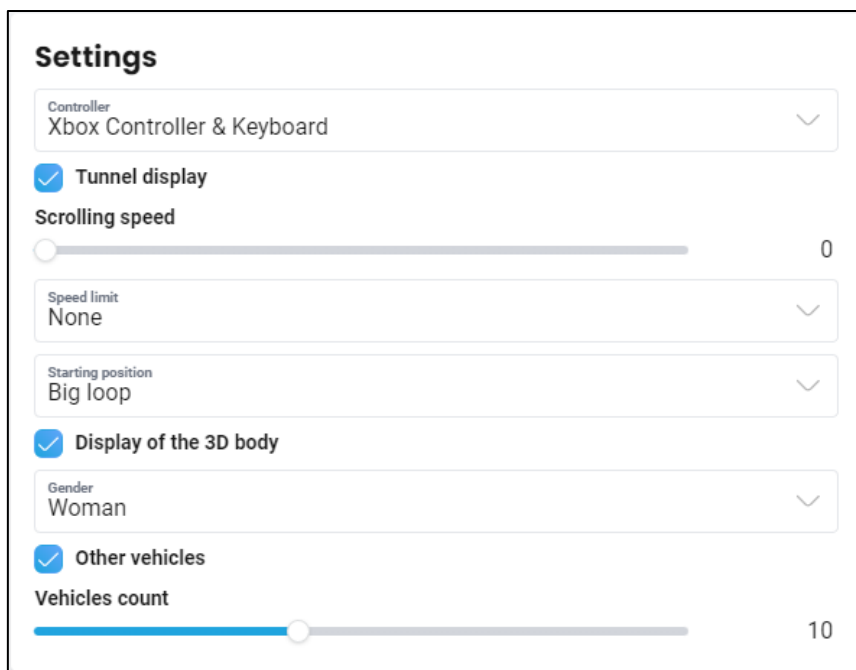
When starting the **Motorway Simulation** software, you reach a home page from which you can find four protocols for men and women with difficulty levels ranging from level 1 to level 2.



**RECOMMENDATION**

It is recommended to start with a low difficulty level in order to measure the patient's tolerance to the stimulation and the proposed VR environment.

For each proposed protocol, the different options are already set. Just validate the selected protocol to start the application.

2.2.2. Settings

The screenshot shows a settings menu with the following options:

- Controller: Xbox Controller & Keyboard (dropdown menu)
- Tunnel display
- Scrolling speed: 0 (slider)
- Speed limit: None (dropdown menu)
- Starting position: Big loop (dropdown menu)
- Display of the 3D body
- Gender: Woman (dropdown menu)
- Other vehicles
- Vehicles count: 10 (slider)

These are the initial settings. Most of them can be changed at all times using the Xbox controller (remote control), the keyboard shortcuts or on-screen controls.

Controller:**WARNING**

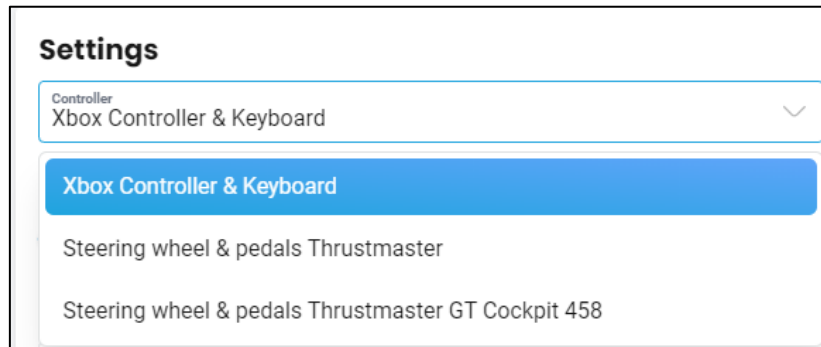
The steering wheel shall be the same as the one configured in the administration settings.

The selection is made directly from a drop-down menu, select:

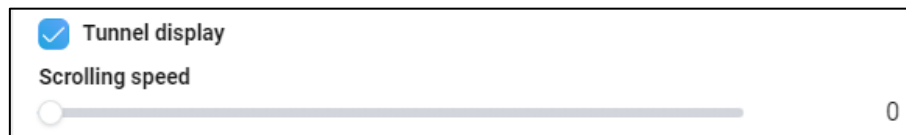
- **Thrustmaster GT cockpit 458** for Ferrari 458 steering wheel.



- **Thrustmaster** for other references.



Tunnel display:



The tunnel can be displayed or not by activating or not the check box.

If this option is enabled, the car will travel through tunnels.

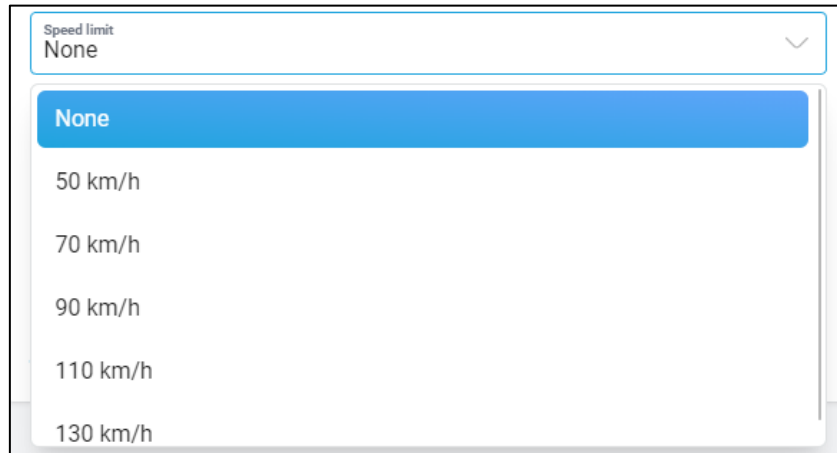
Enabling it unlocks the **scrolling speed**.

Scrolling speed:

Modulated using the cursor.

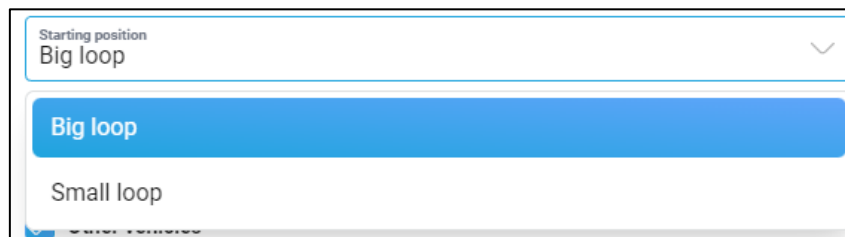
Value: 0 to 4.

Speed limit:



Several speed limits available in the drop-down list: none, 50 km/h, 70 km/h, 90 km/h, 110 km/h and 130 km/h.

Starting position:



2 routes are available. This parameter is used to position the vehicle on one of the two circuits to start the session. The type of loop is selected from the drop-down list.

Display 3D body:



This parameter can be enabled or disabled using the checkbox.

If this option is enabled, the body's **gender** can be chosen.

Gender:

Selection is made from a drop-down menu.

Other vehicles:





Activates the presence of other vehicles. None of them appear in the left-hand overtaking lane.

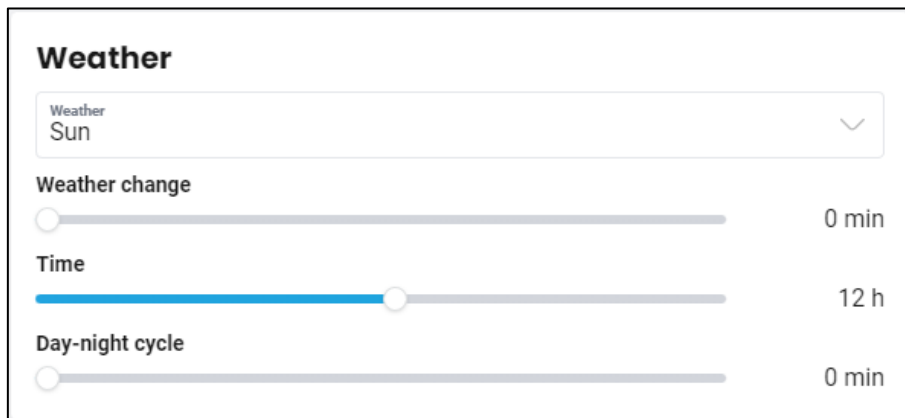
If the option is checked, the **vehicle count** can be set using the slider.

Vehicles count:

The number of cars on the road is set using the slider.

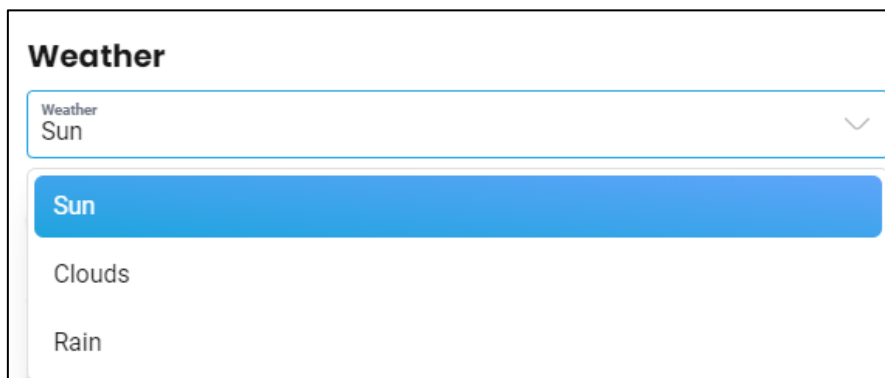
Value: 0 to 25.

2.2.3. Weather



Weather:

Weather conditions are available in the drop-downlist.

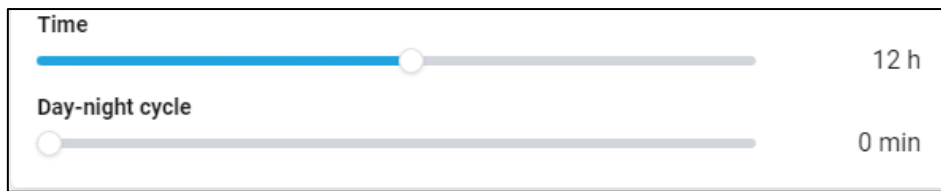


Weather change:

Allows you to define how long weather conditions stay unchanged before switching to a different type of weather.

Value: 0 to 20 minutes.

Time:



By moving the cursor, the practitioner can set the time of day and therefore the corresponding brightness.

Value: 0 to 23 h.

Day - night cycle:

The day – night cycle can be modified using a slider.

Value: 0 to 60 minutes.

Preview:



A preview is available before starting the session.

2.3. Session

Once the presets have been selected, click on the "**Start the session**" button in the bottom right corner of the screen.



In the top left of the screen:

The operator can change the weather, time of day, number of vehicles on the circuit and their speed. He can also choose to display tunnels and modulate their speed.

In the bottom left of the screen, additional settings are available:

- **Show user settings:** if the box is checked, the **Steering Wheel Settings** panel appears in the bottom right corner of the screen.

Once the patient has been set up and the virtual environment has been generated, the practitioner can modify the position of the environment in relation to the virtual avatar to reproduce real conditions as accurately as possible, according to the patient's sensations and physical position in relation to the steering wheel.

Thus, the practitioner can modify the **size of the steering wheel** (from 0.00 to 5.00), its **height** (-2.00 to 2.00) and its **depth** (0.00 to 4.00) (distance to the patient's avatar).

- **Sound intensity:**

Sound can be adjusted using a slider.

- **Position on the circuit:**

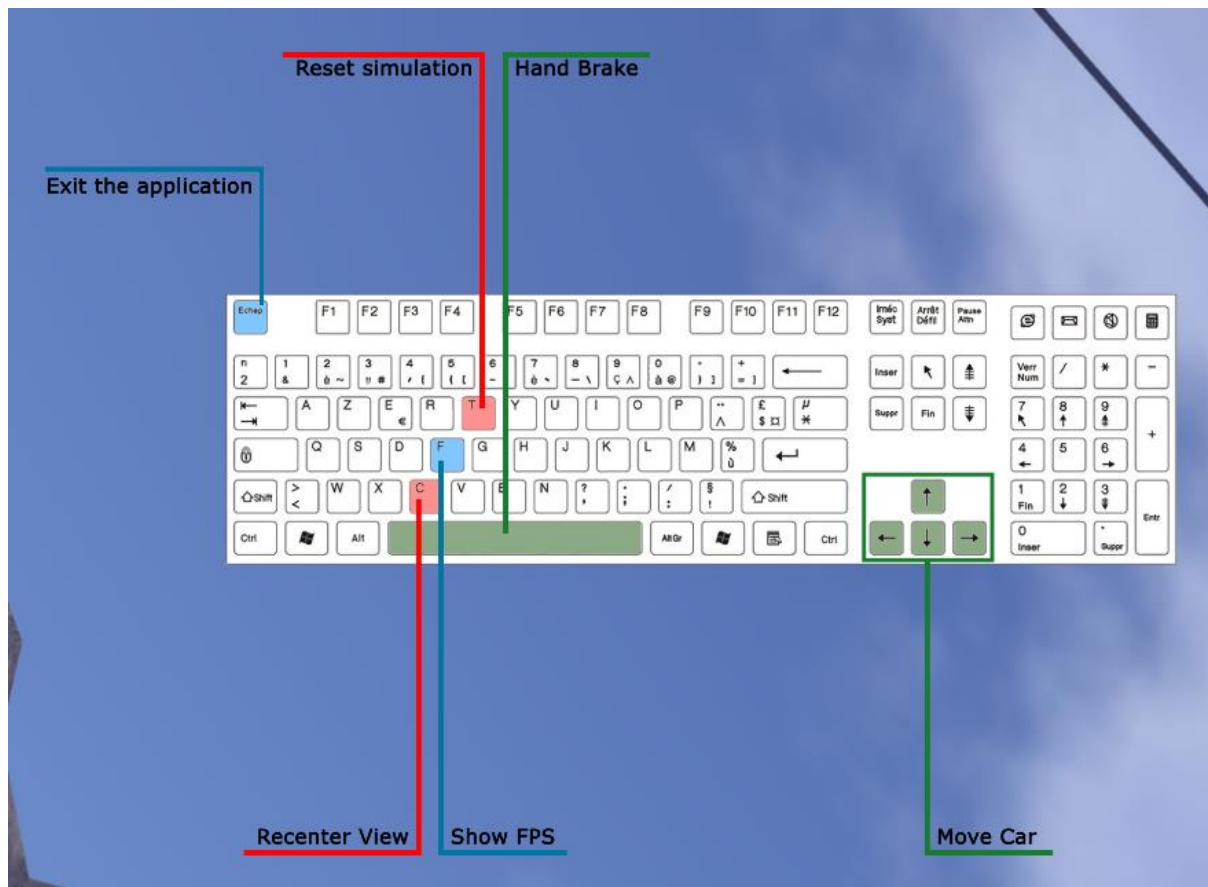
Schematic representation of the vehicle's location on the track in real time. Allows the practitioner to indicate to the patient if they need to change direction and leave the traffic lane to join another circuit.

You can **zoom in on the mini-map** using the mouse wheel and **move around the zoomed-in mini-map** using the left click (click and drag the map while holding down the mouse button).

2.4. Shortcuts

During the session, the shortcut list is found by clicking on the Xbox controller icon in the upper right corner of the screen.

2.4.1. Keyboard

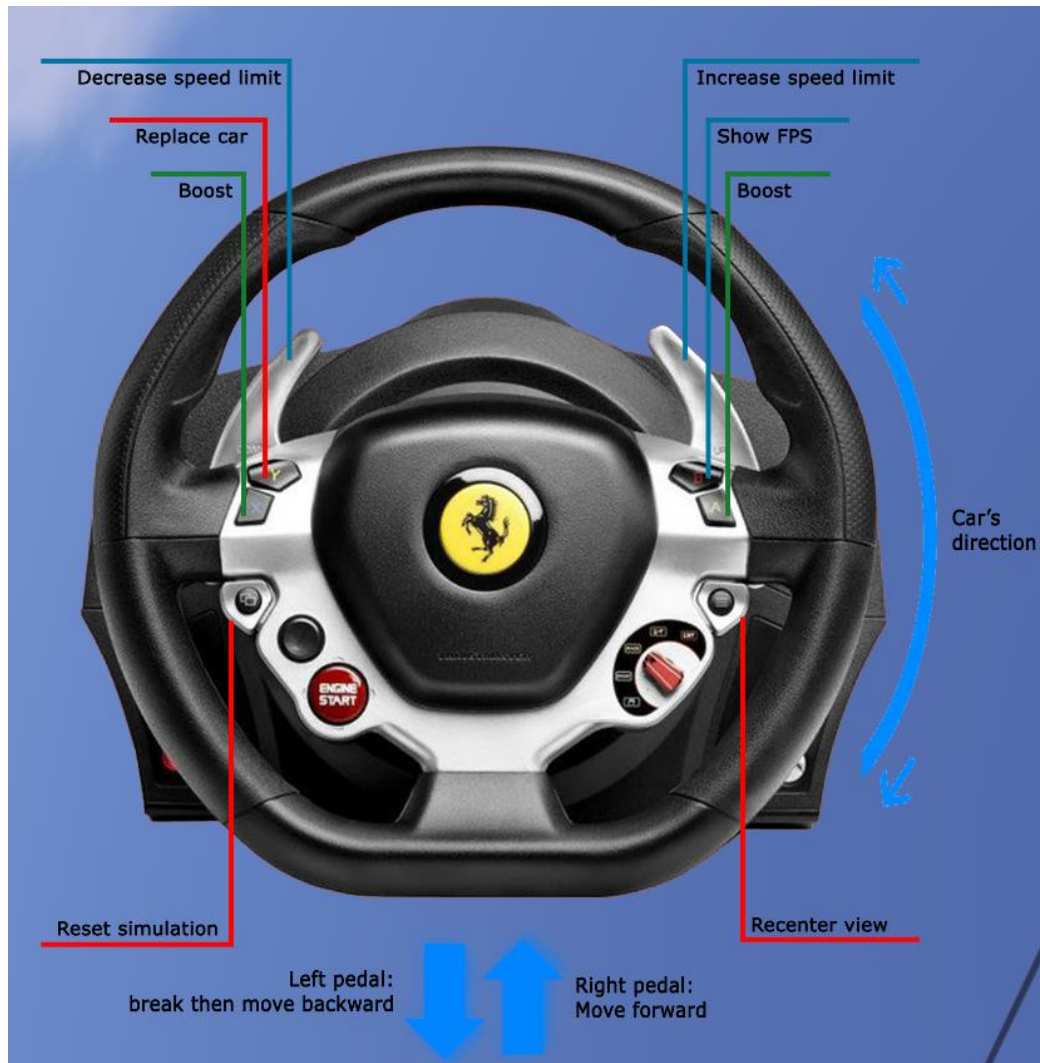


2.4.2. Xbox controller

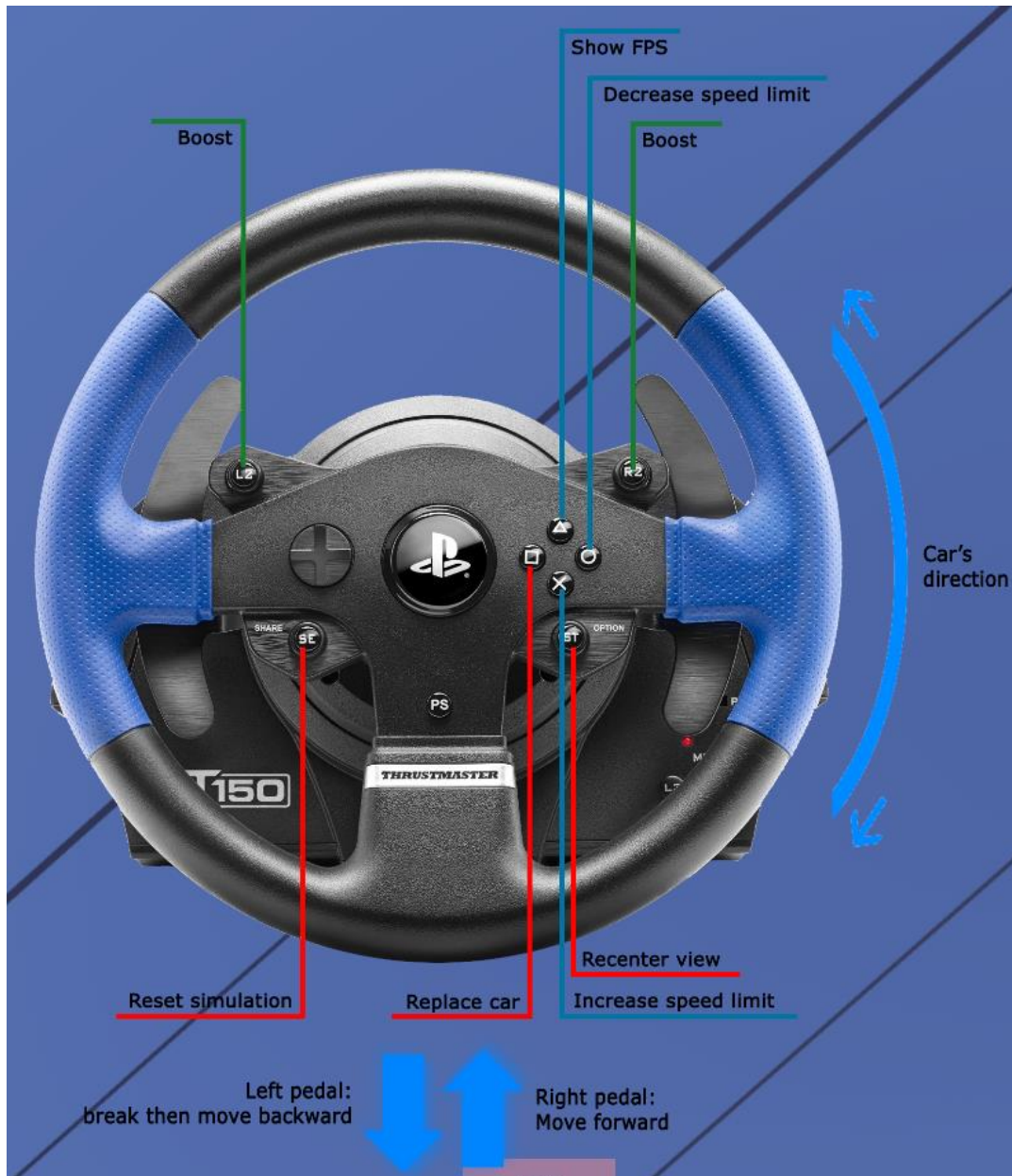


2.4.3. Thrustmaster steering wheels

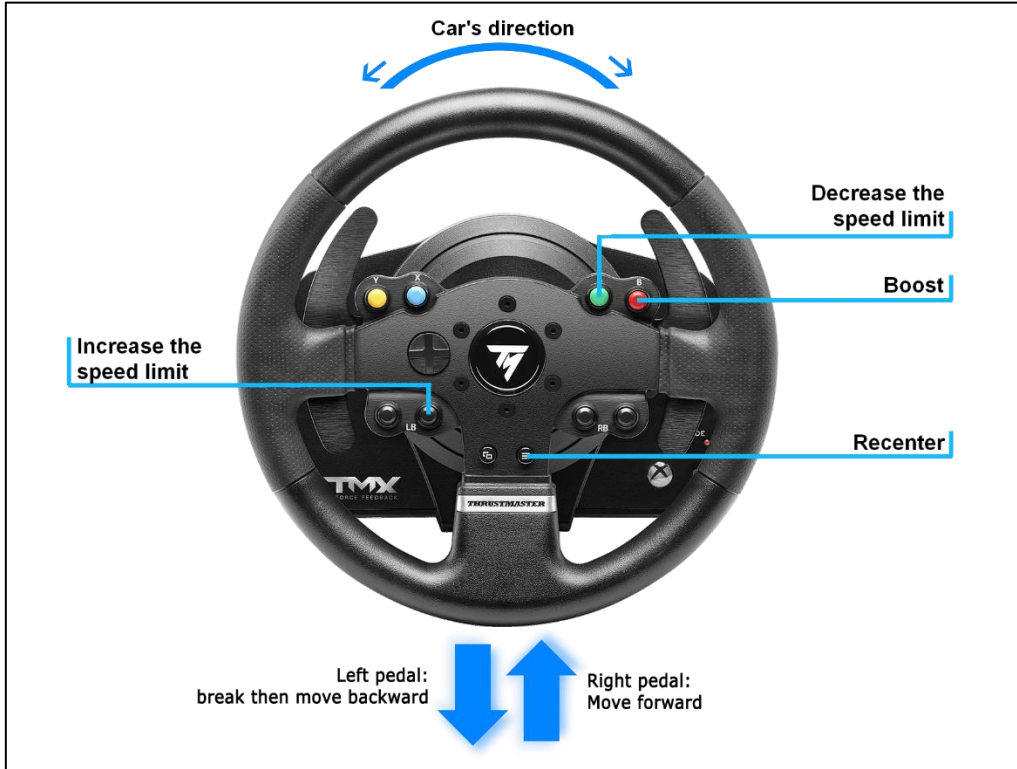
2.4.3.1. GT cockpit 458 / Ferrari 458



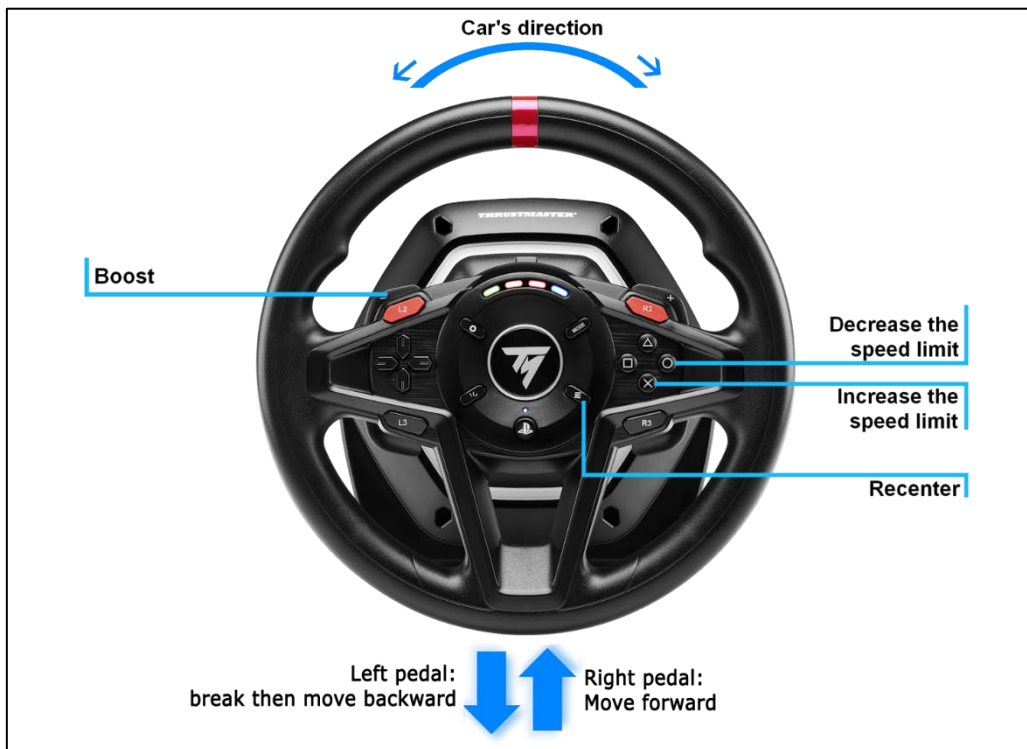
2.4.3.2. T150



2.4.3.3. TMX



2.4.3.4. T128





2.5. Results

No results are displayed at the end of the session.

2.6. Data processing

Data retrieval and analysis uses the Patient Management software (see dedicated user manual).

