

REF Car Simulation

CE Class I Medical Device

User manual

Distribution mode

Available for direct download at
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1. GENERAL

1.1. Description

CAR 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.

CAR SIMULATION software allows you to be a passenger or a driver in a car and to be subjected to the visual scrolling of a landscape.

1.2. Indications

Treatment of Motion Sickness (Kinetosis).

1.3. Contraindications

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

1.4. Module field of application

Specific module for car motion sickness.

The aim here is to put the patient in a situation where they are driving, to reproduce the “optokinetic” type visual-vestibular conflict (i.e. when the vision perceives a movement and the vestibular apparatus does not), in a familiar environment reminiscent of motion sickness in a car.

Visual-vestibular conflict

- Visual Information: present.
- Vestibular Information: absent.

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.



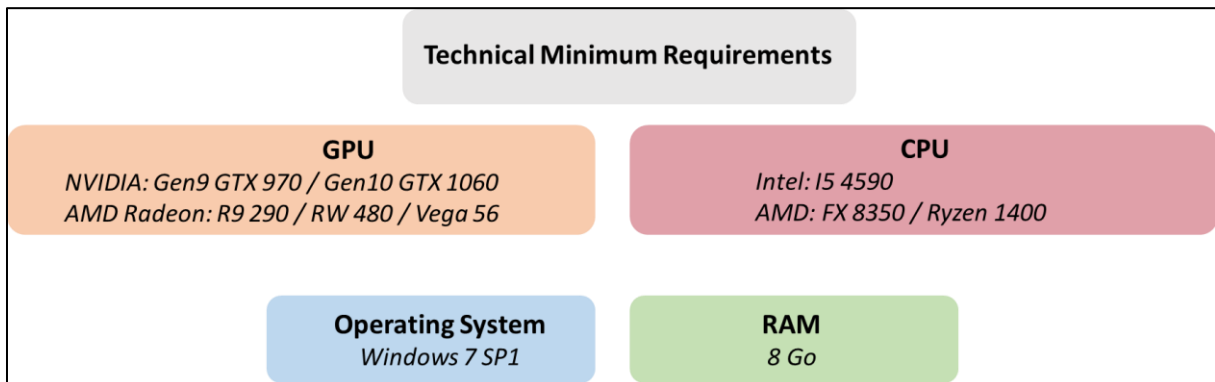
Any serious incident should be notified in writing to qualite@virtualisvr.com

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 steering wheel and pedals kit.

2. SOFTWARE USE

2.1. Patient setup



Patients must be seated to reproduce a situation where they would be sitting in a car.

In **active driving mode**, their hands must be on the steering wheel, and their feet on the pedals.

In **passive driving mode**, they must be seated.

RECOMMENDATION



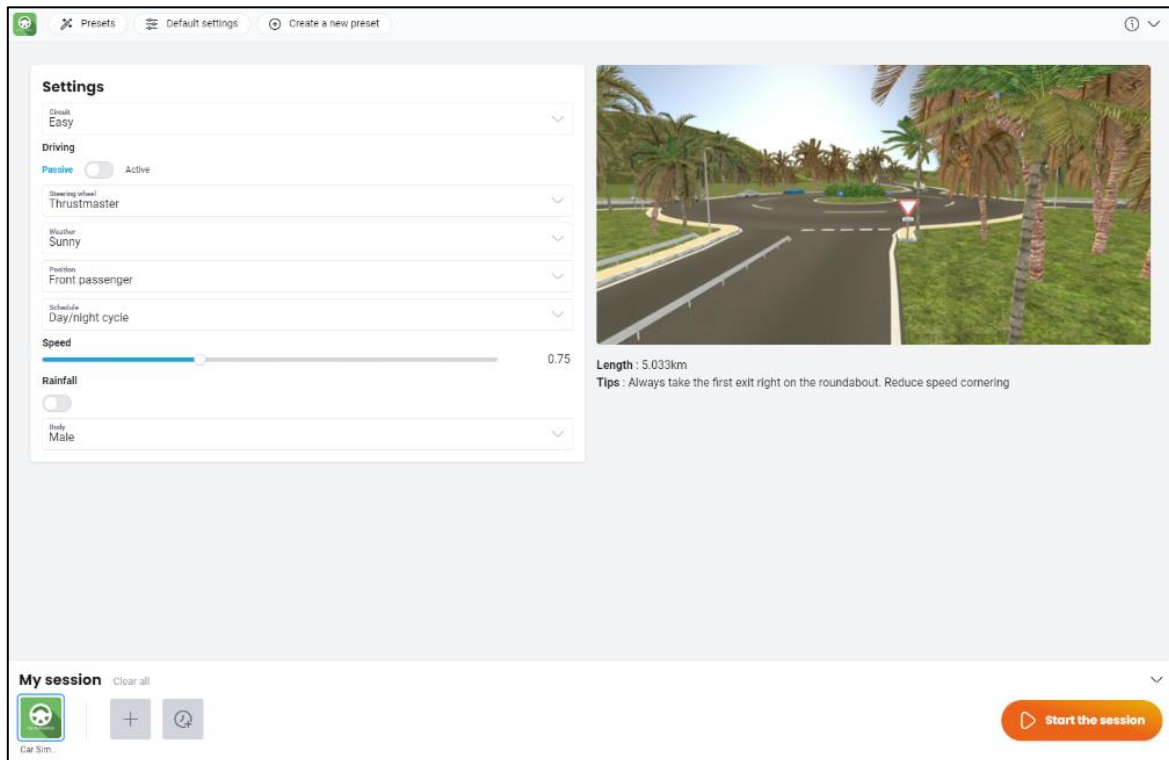
During the first session, it is recommended to use the "**Active Driving**" mode to get patients to drive. (Steering wheel accessory required). Once patients "tolerate" the chosen circuit, they can switch to "**Passive Driving**" mode, namely passenger mode, for their treatment.

2.2. Session settings



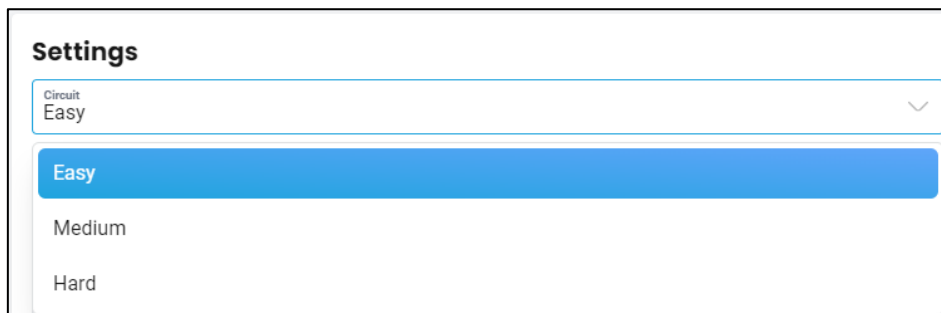
WARNING

If you have both, it is imperative to disconnect the Xbox controller when using the steering wheel. Conflicts appear when both are connected at the same time.




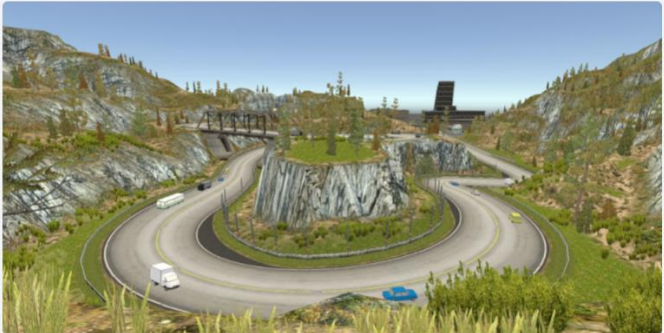
The variable settings for this module are as follows:

2.2.1. Circuit



Environment selection according to difficulty.

According to the difficulty, the length and type of course vary:

Circuit	Display
Easy	 <p data-bbox="563 1335 1011 1373">Length : 5.033km Tips : Always take the first exit right on the roundabout. Reduce speed cornering</p>
Medium	 <p data-bbox="552 1760 655 1783">Length : 3.08km</p>




2.2.2. Driving

Two driving styles are available: active or passive.



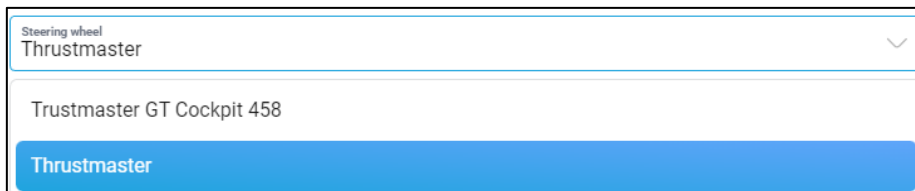
2.2.3. Steering wheel

This setting is only available in **Active driving**.

	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:

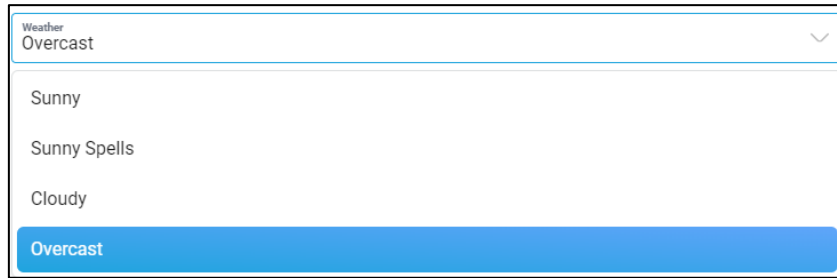
- **Thrustmaster GT cockpit 458** for Ferrari 458 steering wheels.
- **Thrustmaster** for other references.



2.2.4. Weather

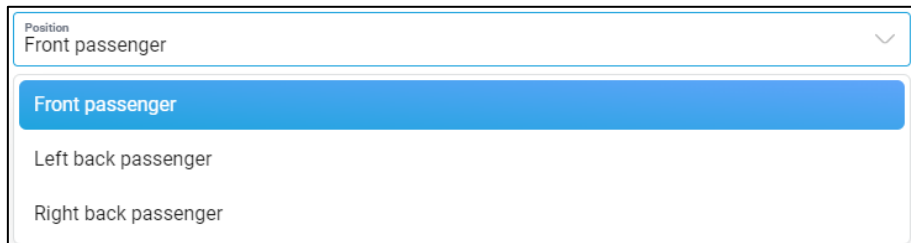


Used to select the weather: sunny, sunny spells, cloudy or overcast.



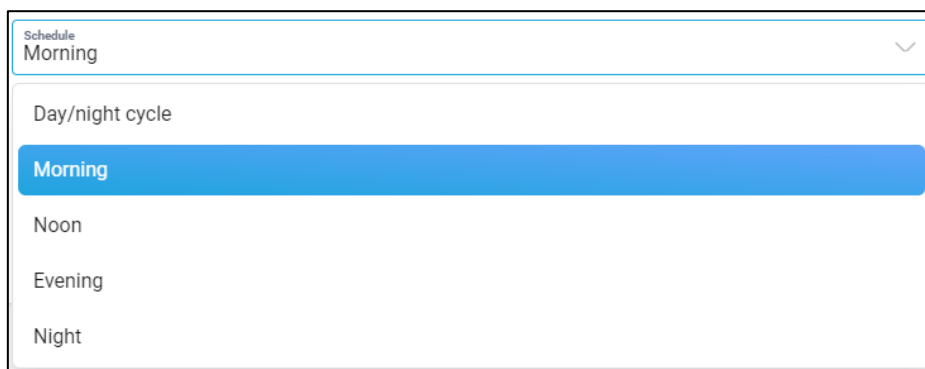
2.2.5. Position

Used to choose the passenger seat in the car: front passenger, left back passenger or right back passenger. This setting is only available when the **Passive driving** mode is selected.



2.2.6. Schedule

Used to choose the time of the day: day/night cycle, morning, noon, evening or night.



2.2.7. Speed





- The animation speed is adjustable.
- Value: 0.10 to 2.0

Factor applied to animation speed. 1.0 corresponds to 100 % of animation speed.

- Can be modulated using the cursor.
- Only available in **passive driving**.

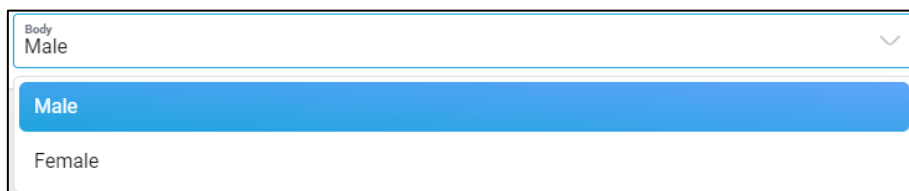
2.2.8. Rainfall

Activates or deactivates rain.



2.2.9. Body

Choice of the body according to the patient's gender



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 bottom left of the screen is the animation speed of the car parameter. It can be adjusted during the session if **Passive driving** was selected. Value: 0.10 to 2.0.

In the bottom right of the screen is the « **Exit** » button to end the session.

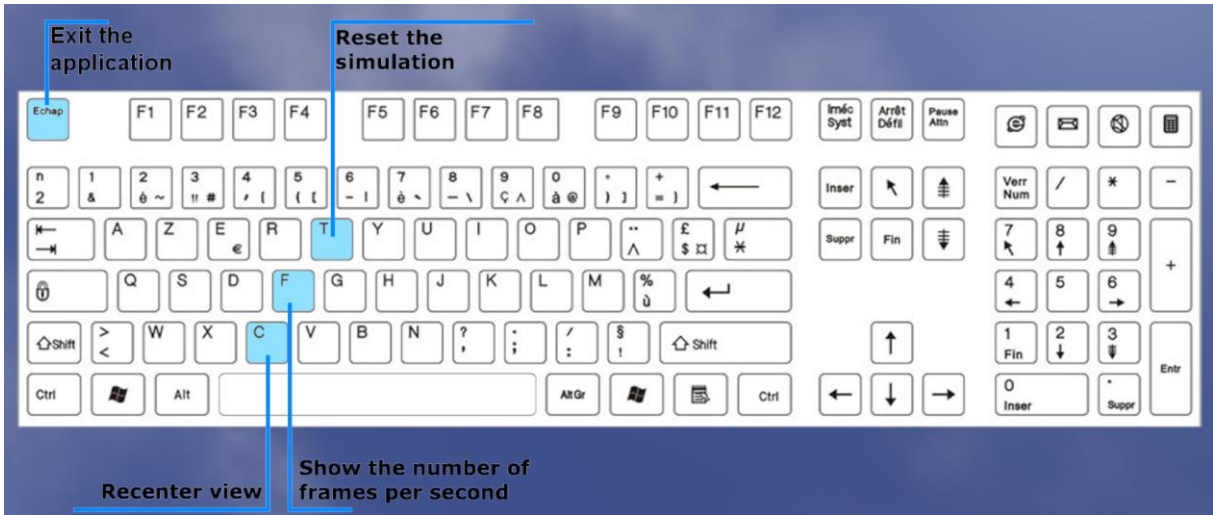
These settings are not visible to the patient.

The patient sees the 3D environment. Depending on the chosen mode, they drive on the circuit using a steering wheel and pedals (controlling speed, cornering, braking, reversing), or they are a passenger in a moving vehicle. Refer to the shortcuts for using the steering wheel and pedals.

2.4. Shortcuts

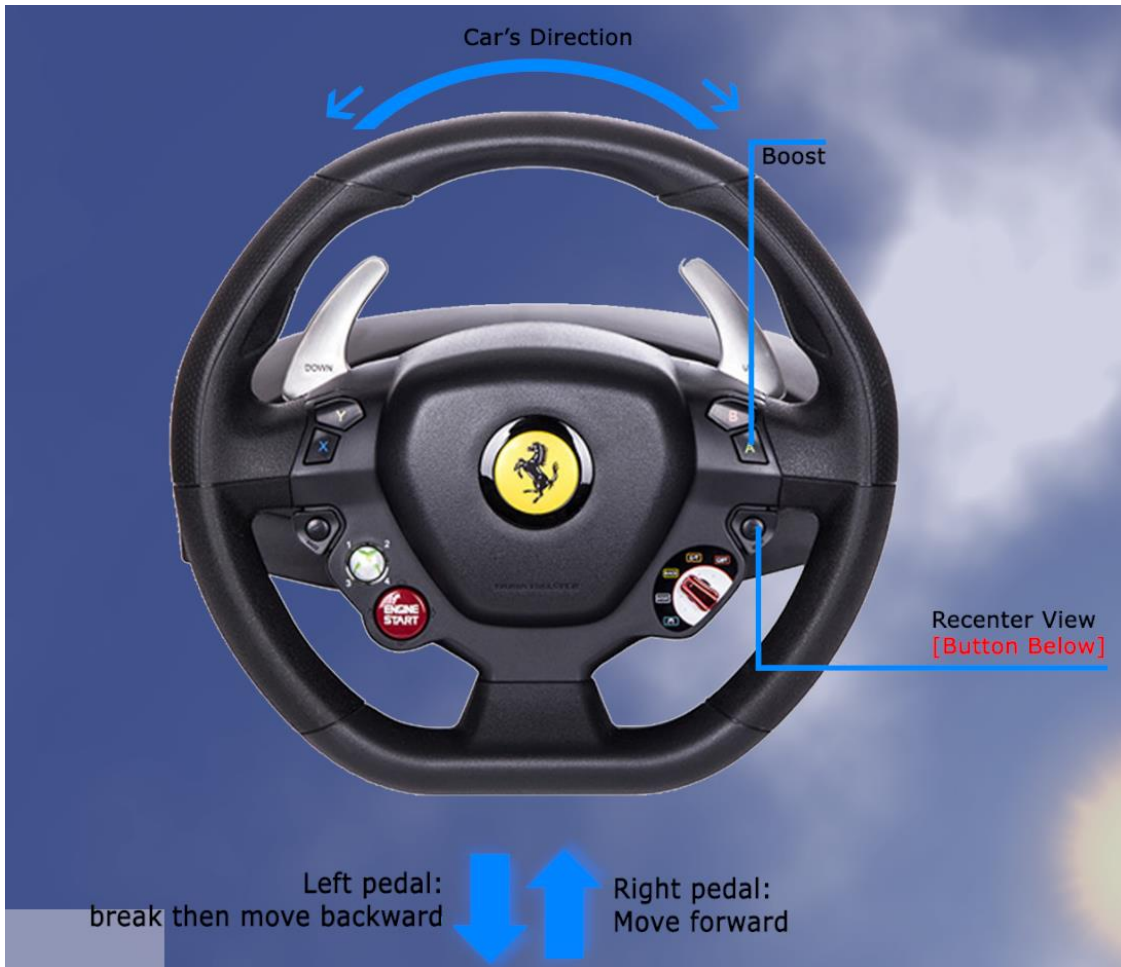
During the session, the shortcut list is found by clicking on the Xbox controller icon in the upper right corner of the screen.

2.4.1. Keyboard



2.4.2. Thrustmaster steering wheels

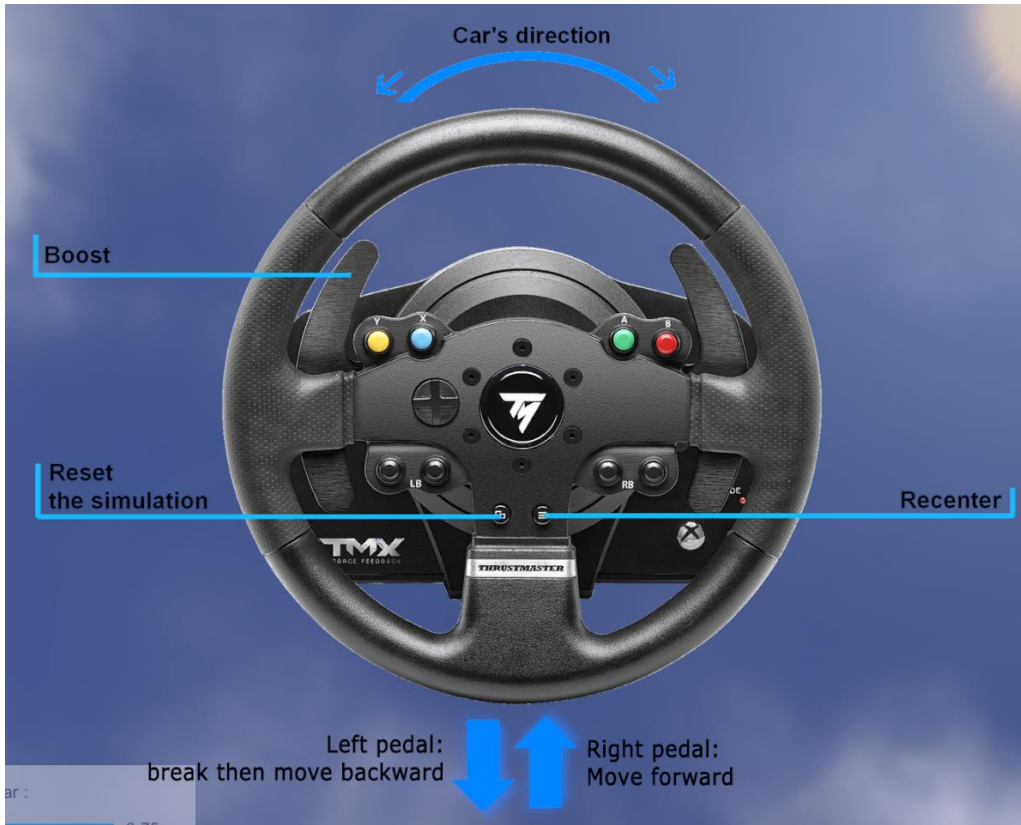
2.4.2.1. GT cockpit 458 / Ferrari 458



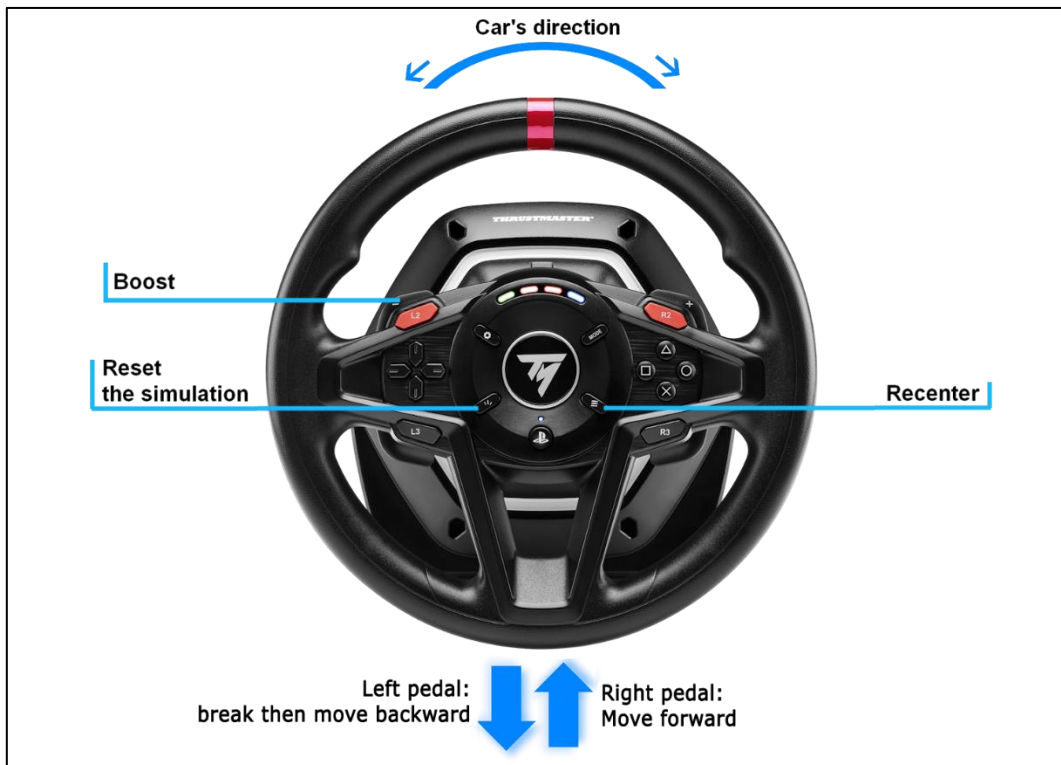
2.4.2.2. T150



2.4.2.3. TMX



2.4.2.4. T128





2.5. Results

No results are displayed at the end of the session.

2.5.1. Report and charts

Click on the histogram icon to access detailed results and the session report.

The screenshot shows the 'Car Simulation' software interface. At the top left, 'Session details' are displayed: 05/07/2024 16:09. A red circle highlights a histogram icon in the top navigation bar. Below the navigation bar, there are three tabs: 'Parameters' (highlighted in blue), 'Results', and 'Notes'. The main content area contains a table with the following data:

Name	Initial value	Final value
Circuit	Easy	Easy
Body	Male	Male
Driving	✓	✓
Steering wheel	Thrustmaster	Thrustmaster
Weather	Sunny	Sunny
Position	Front passenger	Front passenger
Schedule	Day/night cycle	Day/night cycle
Speed	0.75	0.75
Rainfall	✗	✗

At the bottom of the table, there are two buttons: 'Start session with initial values' and 'Start session with final values'.

2.6. Data processing

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

