

# TrafficSim – User Guide

## 1. Introduction

TrafficSim is a graphical simulation tool based on SUMO that allows you to start, control and observe traffic simulation in real time. The application provides basic simulation controls, zoom and navigation features, and live statistics.



## 2. User Interface Overview

The application window is divided into three main areas:

- Top Toolbar – Simulation controls and tools
- Center Area – Traffic visualization
- Right Panel – Simulation statistics

## 3. Visualization Area

The central visualization panel displays the road network and vehicles

- Roads and intersections are drawn dynamically
- Vehicles are shown moving through the network
- Zoom and pan allow detailed inspection

## 4. Statistics Panel

The right hand panel displays live simulation vehicles:

- Vehicles – number of active vehicles
- Average Speed – Mean speed of all vehicles
- Stopped – Number of stopped vehicles
- CO<sub>2</sub> – estimated emissions (kg)
- Fuel consumption – estimated fuel consumption (kg)

- Visible – number of vehicles, which are visible on the map
- Arrived – number of vehicles, which are reached their final destination
- Average Density – average density on roads of simulation
- Average Occupation – average percent of roads occupation

*These values update continuously during the simulation*

## 5. Notes & Limitations

- SUMO must properly installed and configured
- Large stress test may reduce performance
- This software is intended for educational and experimental use

## 6. Toolbar Controls

### I. Start SUMO

*Starts the traffic simulation using the configured SUMO scenario.*

- Load sumo config file
- Enabled at the application start
- Disabled while the simulation is running

### II. Pause/Resume

*Pauses or resumes the simulation*

- When paused, the simulation time stops
- Button label changes between Pause and Resume

### III. Step

*Advances the simulation by one single step*

- Only enabled when the simulation is paused
- Useful for detailed analysis

### IV. Stop

*Stops the simulation completely, erase map and resets the time counter*

- Re-enables the “**Start button**”
- Disables all simulation controls

### V. Add Car

*Opens a dialog to manually insert a vehicle into the simulation*

- Allows custom vehicle parameters
- Only available while the simulation is running

### VI. Filter Vehicles

After press on “Filter” button in toolbar, you will see a dialog window for setting up filters to show specific cars. You can filter by next parameters:

- Speed of the vehicle (minimal and maximum)
- Color of the vehicle
- Is vehicle stopped or not

## VII. Traffic Light Control

You could manipulate traffic lights by clicking on them:

- Usual click – change traffic light state to the next one
- Long-press click – open a dialog window, where you can set up custom rule for traffic light

## VIII. Export Report

You could export report with statistic from simulation. For doing that you need to click on the “Export CSV” button on right panel.

## IX. Stress Test

*Runs an automated stress test by injecting multiple vehicles*

- Used to test network performance and congestion
- Intended for experimental and analysis purposes

## X. Zoom Controls

- “+“ Zoom in
- “-“ Zoom out

*Additional controls:*

- **Mouse Drag** → Pan the map
- **Mouse Scroll** → Zoom in/out

## XI. Help

*Opens the User Guide as a PDF document in your system’s default PDF viewer*

## 7. Typical Workflow

1. Start the application
2. Load sumo config file
3. Click Start SUMO
4. Observe traffic flow
5. Pause or step through the simulation if needed
6. Add vehicles or run stress test
7. Stop the simulation to reset

## 8. Support

If you encounter issues:

- Check your SUMO configuration files
- Verify that required resources are available
- Restart the application if needed

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*End of Help Document*

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