## SUMO Features

The SUMO simulation tool suite offers many features:

- **Microscopic**: All vehicles, pedestrians and public transport are modeled explicitly.
- **Online interaction**: The user can interact with the simulation by using a live interface called TraCI.
- **Simulation of multimodal traffic**: Besides vehicles, SUMO simulates public transport and pedestrians.
- **Traffic lights**: Time schedules of traffic lights can be imported or generated automatically by SUMO.
- **Performance**: There are no artificial limitations in network size and number of simulated vehicles.
- **Network Import**: You can import common network formats e.g. OSM, VISUM, VISSIM, NavTeq.
- **Portability**: SUMO is implemented in C++ and uses only portable libraries.

SUMO includes traffic simulation components as specialized tools to automate the cumbersome tasks of creating a traffic scenario. The following tools are available:

- **SUMO**: command line simulation
- **GUISIM**: simulation with a graphical user interface
- **NETCONVERT**: network importer
- **NETGEN**: synthetic network generator
- **OD2TRIPS**: converter from origin/destination O/D matrices to trips
- **JTRROUTER**: routes generator based on turning ratios at intersections
- **DUAROUTER**: routes generator based on a dynamic user assignment
- **DFROUTER**: route generator with use of detector data

## Applicability

SUMO has been used in several projects for answering a large variety of research questions:

- Evaluate the **performance of traffic lights**, including the evaluation of modern algorithms up to the evaluation of weekly timing plans.
- **Vehicle route choice** has been investigated, including the development of new methods, the evaluation of **eco-aware routing** based on pollutant emission, and investigations on network-wide **influences of autonomous route choice**.
- SUMO was used to provide **traffic forecasts** e.g. for authorities of the City of Cologne during the Pope's visit in 2005 and during the Soccer World Cup 2006.
- SUMO was used to support simulated in-vehicle te-lephony behavior for evaluating **the performance of GSM-based traffic surveillance**.
- SUMO is widely used by the **V2X community** for providing realistic vehicle traces, and for evaluating applications in an on-line loop with a network simulator.

SUMO has been used in several national and international projects such as

- VABENE:     www.dlr.de/vabene
- Soccer:       www.dlr.de/soccer
- iTETRIS       www.ict-itetris.eu
- DRIVE C2X    www.drive-c2x.eu
- COLOMBO:   www.colombo-fp7.eu
- AMITRAN:    www.amitran.eu

## License and Community

SUMO is released under the GNU General Public License (GPL3). The GPL3 is the most widely used open source license and it guarantees the following freedoms:

- freedom to download and use SUMO
- freedom to examine and to modify the SUMO sources
- freedom to use the contributions that are made available in the SUMO community

These features are not only valuable for professional users, they are also essential for scientific researchers as they facilitate peer reviews of models and computational results.

Since SUMO was first released to the public in 2001 an active international community of professional users and contributors has grown. It is supervised by DLR and constitutes a valuable space for technical and scientific discussions. DLR also offers professional support, training and consultancy for SUMO.

Download SUMO from **http://sumo.dlr.de/** and join the SUMO community!
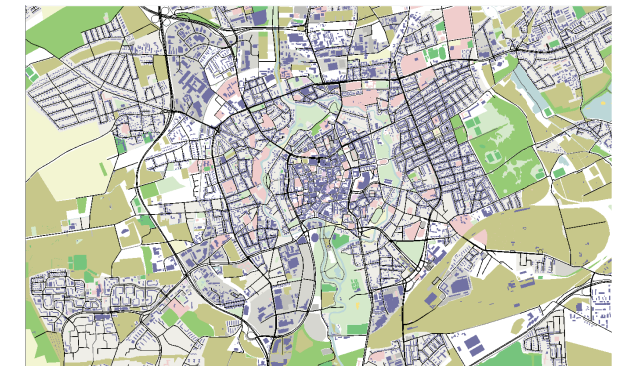


**Microscopic traffic simulation for entire cities in real-time**

# Overview

Traffic simulations are of immense importance for resear-chers as well as practitioners in the field of transport systems. SUMO (Simulation of Urban Mobility) is an open source tool suite that offers a full range of road traffic simulation functionalities – including individual persons and public transport.

For the traffic modelling professional it includes tools to route vehicles, to visualize traffic situations and to calculate emissions. For a researcher in traffic management and transportation systems, it can serve as an easily extendible library of functionalities. SUMO makes it easy to implement and analyse the effects of new ideas for intelligent trans-portation systems or autonomous driving by offering the means to dynamically influence almost every aspect of a running simulation.



**Graphical User Interface of SUMO**

## DLR at a glance

DLR is the national aeronautics and space research centre of the Federal Republic of Germany. Its extensive research and development work in aeronautics, space, energy, transport and security is integrated into national and international cooperative ven-tures. In addition to its own research, as Germany's space agency, DLR has been given responsibility by the fede-ral government for the planning and implementation of the German space programme. DLR is also the umbrella organisation for the nation's largest pro-ject management agency.

DLR has approximately 8000 employees at 20 locations in Germany: Cologne (headquarters), Augsburg, Berlin, Bonn, Braunschweig, Bremen, Bremerhaven, Dresden, Goettingen, Hamburg, Jena, Juelich, Lampoldshausen, Neustrelitz, Oberpfaffenhofen, Oldenburg, Stade, Stuttgart, Trauen, and Weilheim. DLR also has offices in Brussels, Paris, Tokyo and Washington D.C.

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SUMO

# SUMO

An Open Source
Traffic Simulation

DLR