

Traffic simulation for all: a real world traffic scenario from the city of Bologna

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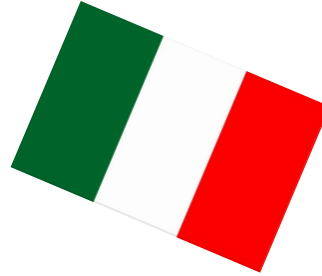
Wissen für Morgen

Traffic simulation and Open Data

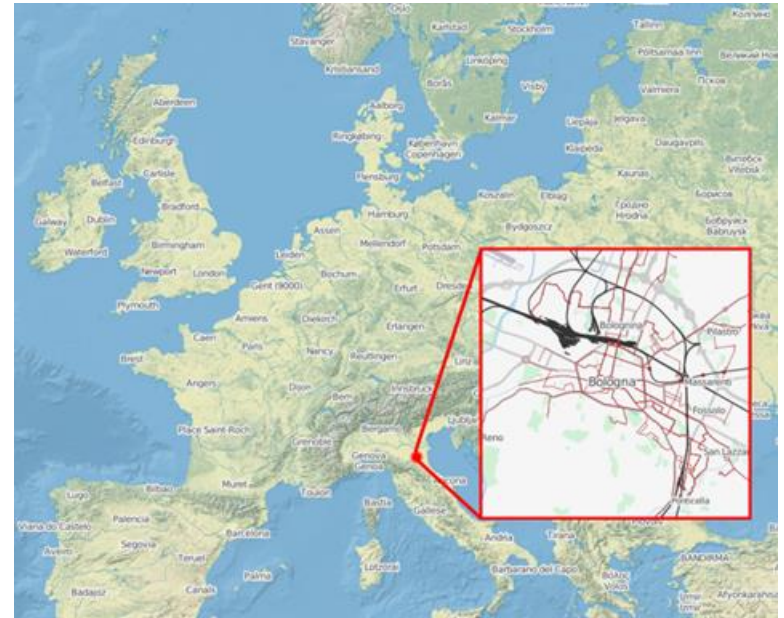
- Modelling real world scenarios is time consuming
- Quality depends strongly on input data
- Representation needed of
 - the road network
 - the demand
 - real traffic lights
 - Infrastructure
- Data is difficult to obtain (especially traffic light signal plans are rarely available to the public)



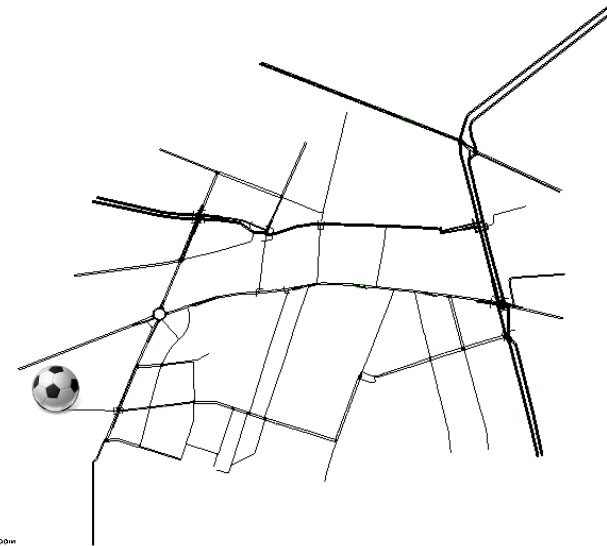
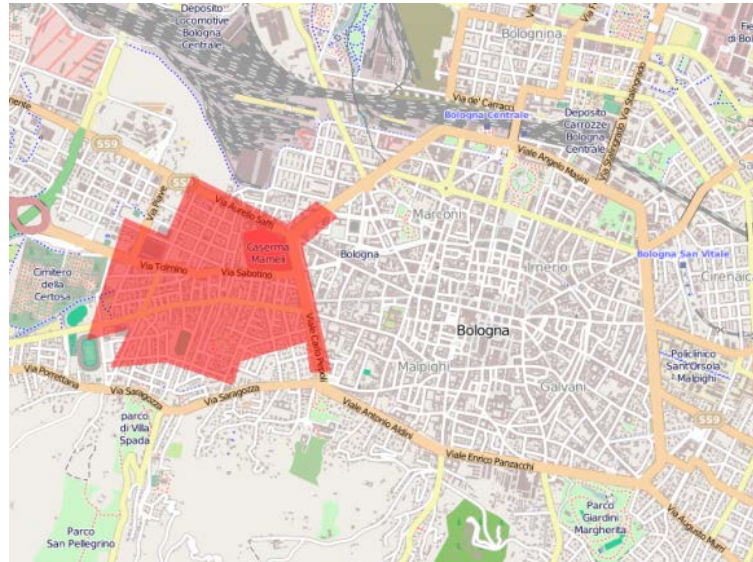
Bologna Scenarios



- Therefore, the real world scenarios from the city of Bologna are made public available within the SUMO package in the next release 0.21
- Scenarios can be used for further research with little effort
- Scenarios were mainly developed within the iTETRIS project



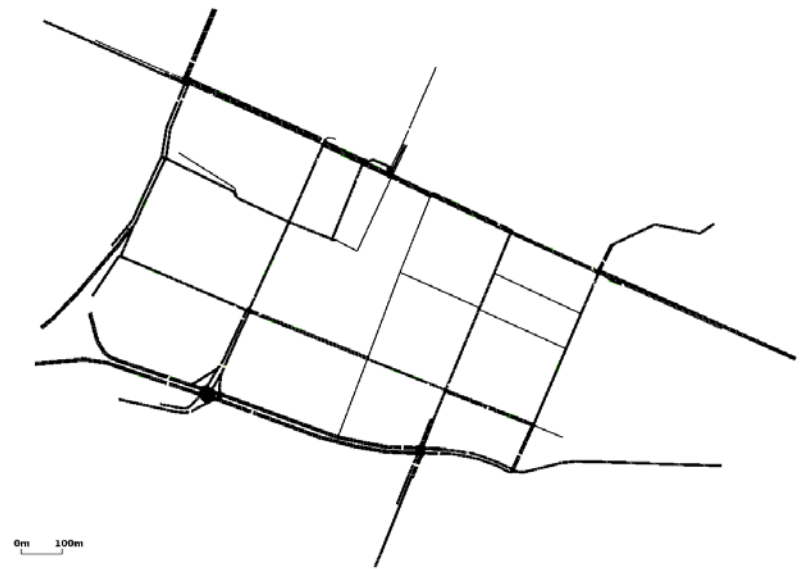
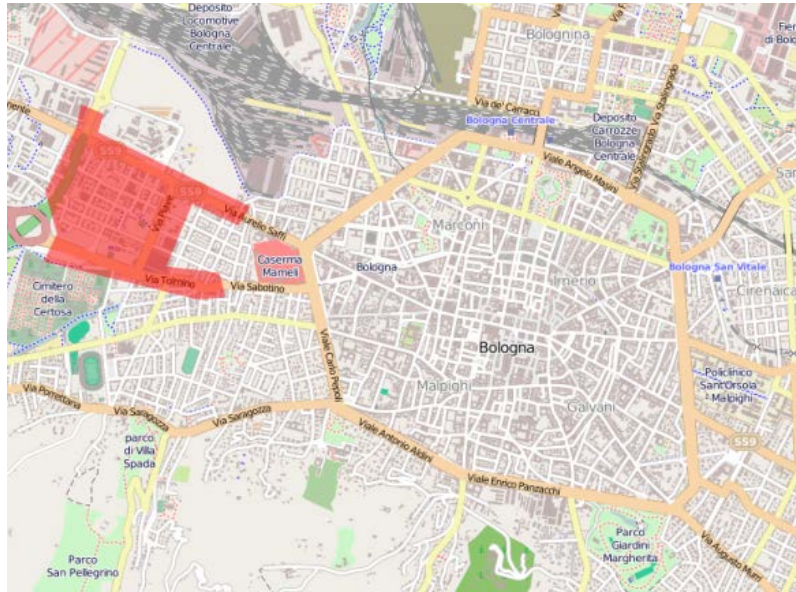
1. Andrea Costa



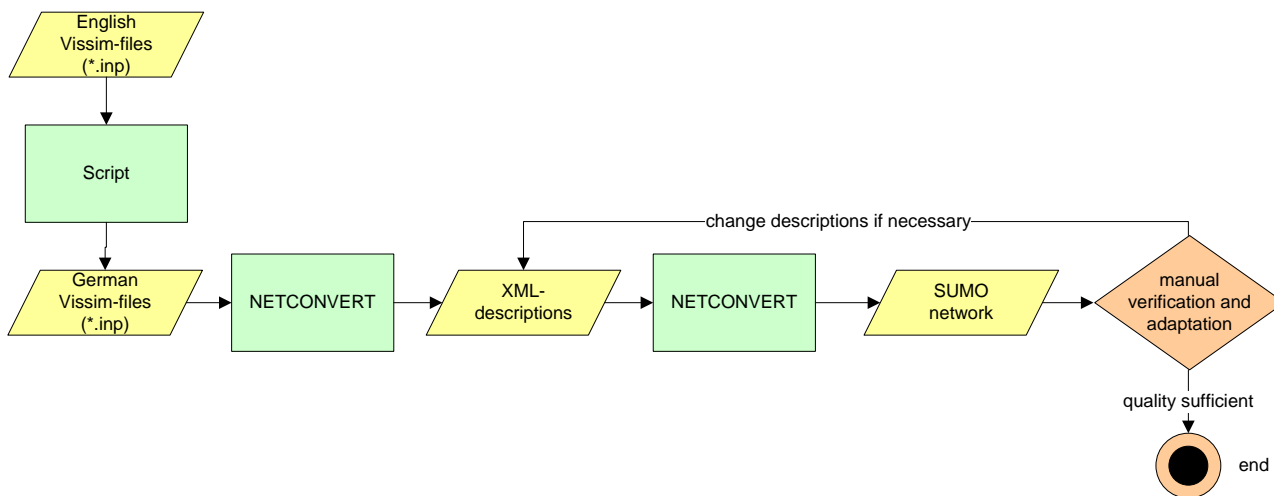
- VISSIM Network
- Peak hour traffic demand (8am- 9am)
- Simulate big events such as football matches or concerts



2. Pasubio



Development of the Scenario: Street Network



- SUMO only allows importing VISSIM networks stored in German language
- Validation with images from Google Earth and Google Maps
- Manual changes especially for connections between lanes over intersections

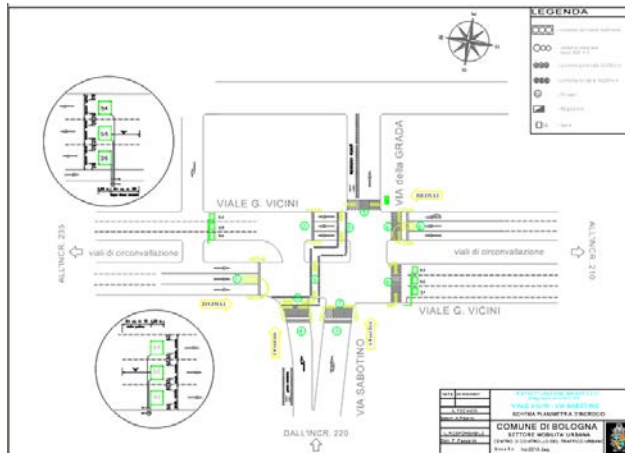


Development of the Scenario: Public Transport



Development of the Scenario: Traffic lights

- Definitions of traffic lights were given as telemetry files in dwg format
- signal time plans given in Excel format
- contain “variable phases” used by the UTOPIA system to adapt the traffic lights to the current demand on the controlled roads
- Adaption is currently not used



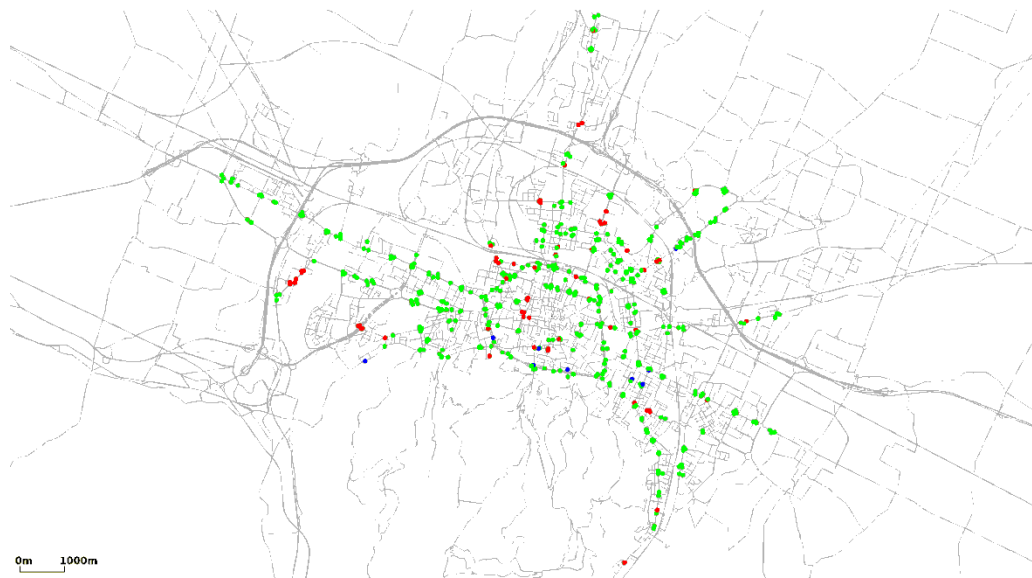
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1	SPOT	1V	2F	3V	4F	5F													
2	MIN	3	12	24	18	18													
3	time	21	12	24	18	18													
4	MAX	84	12	51	18	18													
5		CF1	3	4	5	6	CF2	7	8	9	10								
6	lights											Green	Amber						
7	1	21 21 1 1											49	4					
8	2												49	4					
9	3												38	4					
10	4												32	4					
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Development of the Scenario: Traffic Demand

- Measured values from:
 - 636 detectors within Bologna
 - Unfortunately only traffic flow not speed
 - no distinction between different vehicle classes is given
 - Measured every 5 minutes
 - Data of 3 days

Visualization of counts given for 11.11.2008; green: correct values, red: detection site indicated error, blue: values are missing

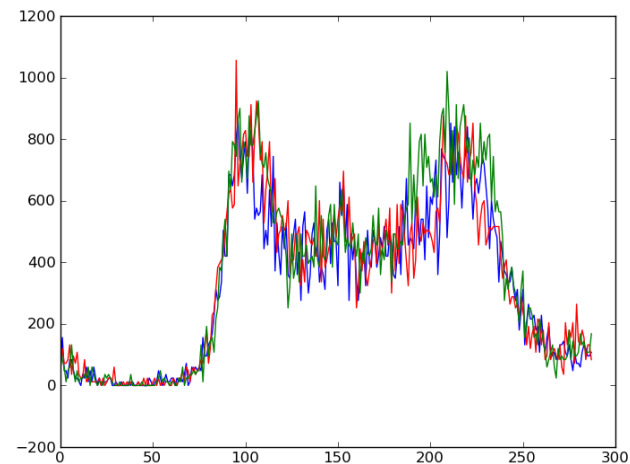


Development of the Scenario: Traffic Demand

- measures from the days 11.11.2008-13.11.2008, Tuesday to Thursday
- About 90 detectors reported an error
- Compare to other sites the quality is very good

VISSIM scenarios:

- Describe traffic infrastructure and demand
 - Includes public transport
- Data was imported into the SUMO scenarios, but manual correction were necessary



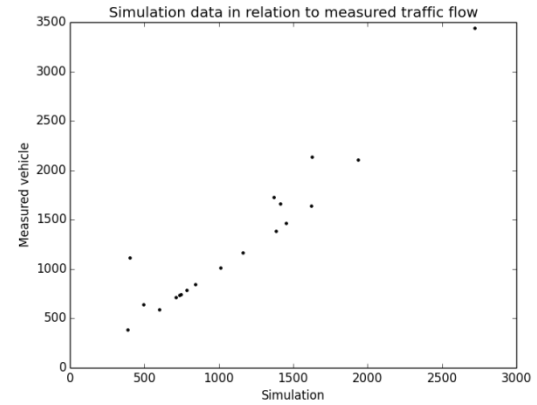
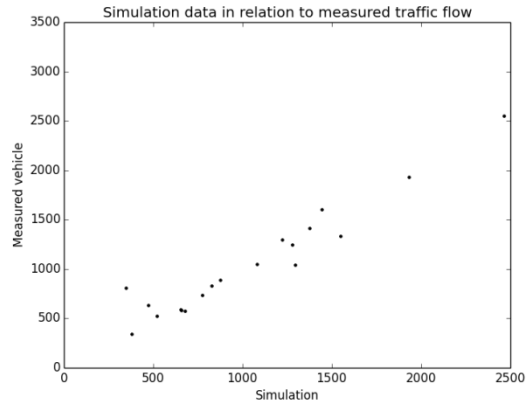
Example traffic flow of three days;
blue: 11.11., red 12.11., green: 13.11.



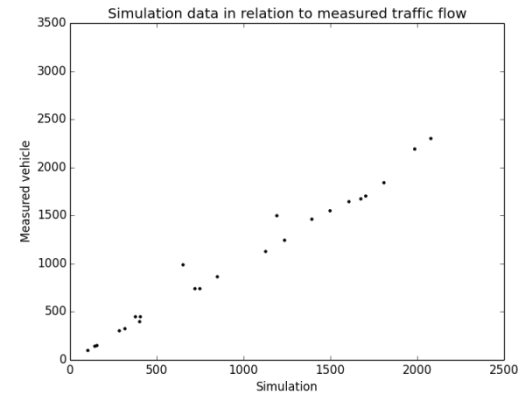
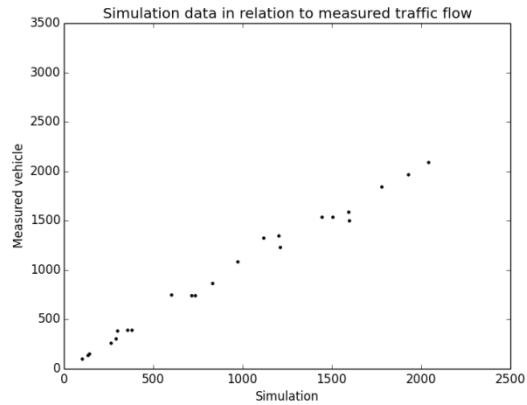
one hour

whole simulation

A. Costa



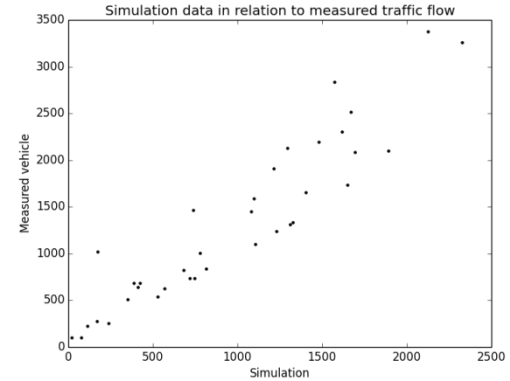
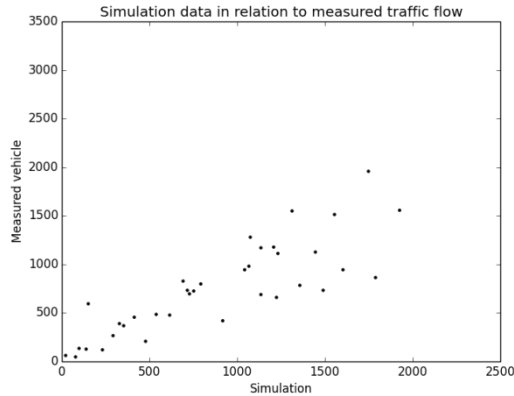
Pasubio



one hour

whole simulation

Joined



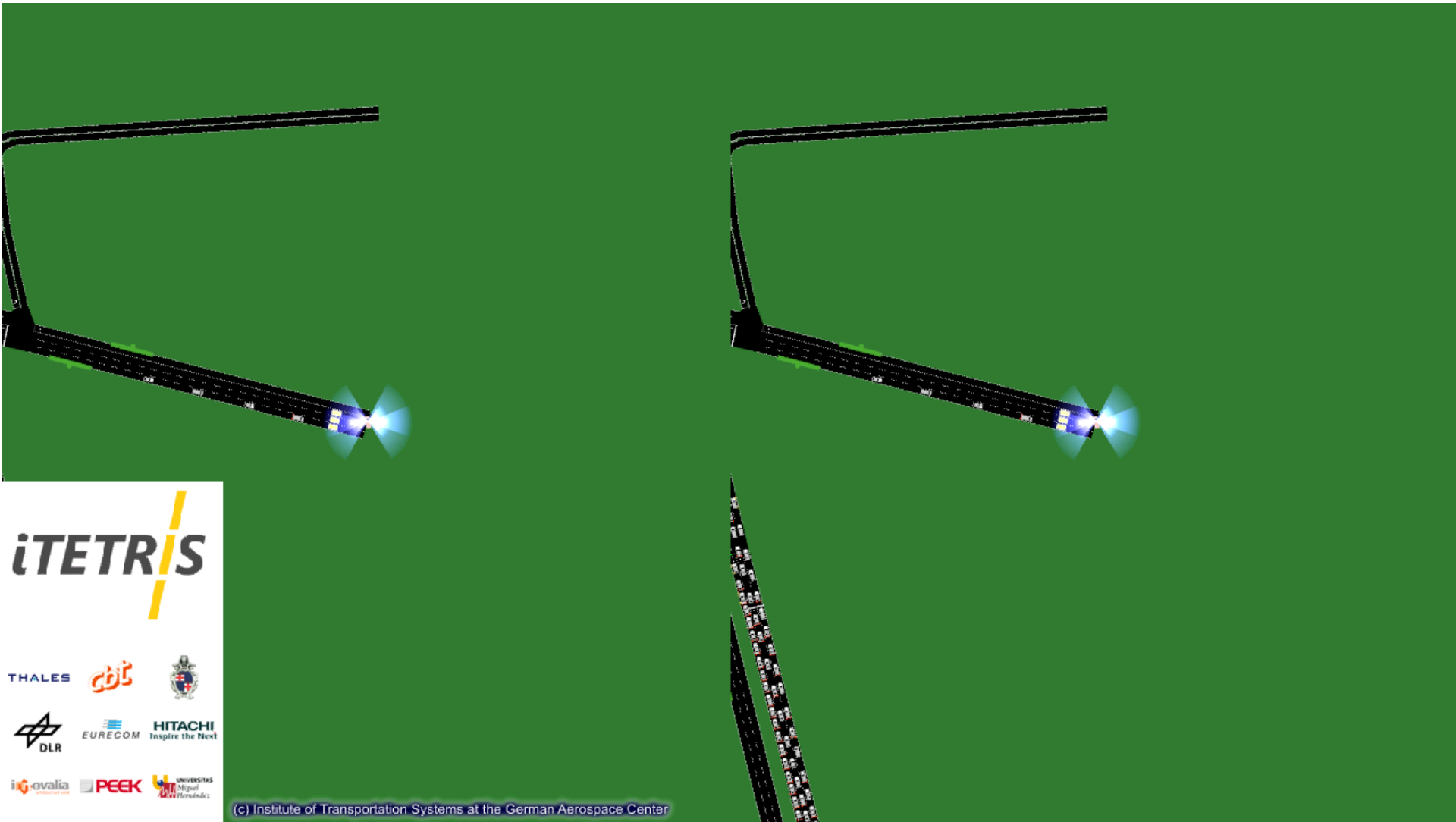
- SUMO has problems to simulate larger scenarios within one hour
- Known problem: traffic simulations need a warm-up period to fill the network, before a realistic network state is reached



User guidelines

- Bologna scenarios are a good way to start research with less effort
- Limitations:
 - Traffic demand is only for one hour
 - Network size is relatively small
 - Size too small to simulate realistic rerouting behaviour
- Examples:
 - C2X Application for Emergency Vehicles
 - Rerouting Vehicles over bus lanes in case of an event







iTETRIS

THALES  

  **HITACHI**
Inspire the Next

(c) Institute of Transportation Systems at the German Aerospace Center



Further Work

- Hope: The quality of the scenario will improve because of the contribution of other researchers
- Prepare larger scenarios



Questions? Comments?

