

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

Laura Bieker, Daniel Krajzewicz, Antonio Pio Morra,  
Carlo Michelacci and Fabio Cartolano



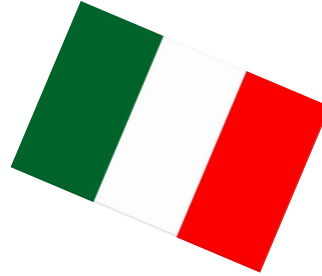
Wissen für Morgen

# Traffic simulation and Open Data

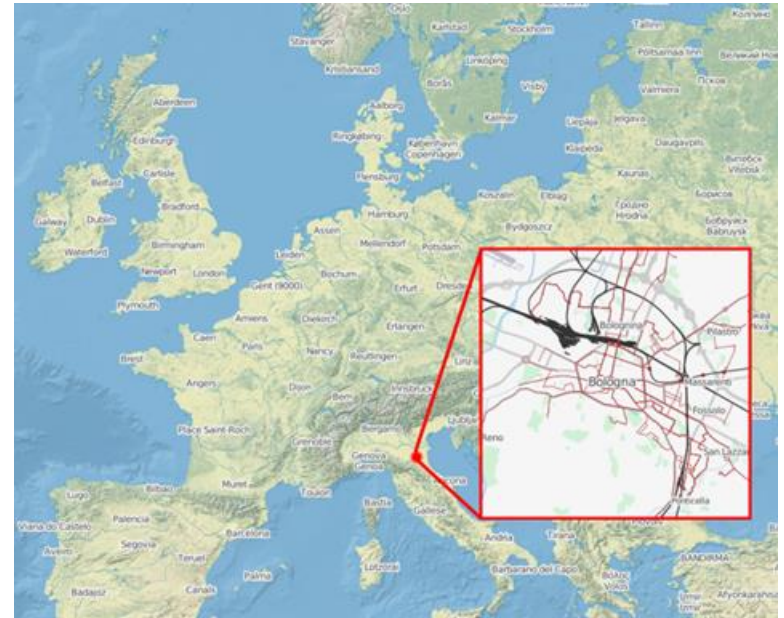
- Modelling real world scenarios is time consuming
- Quality depends strongly on input data
- Representation needed of
  - the road network
  - the demand
  - real traffic lights
  - Infrastructure
- Data is difficult to obtain (especially traffic light signal plans are rarely available to the public)



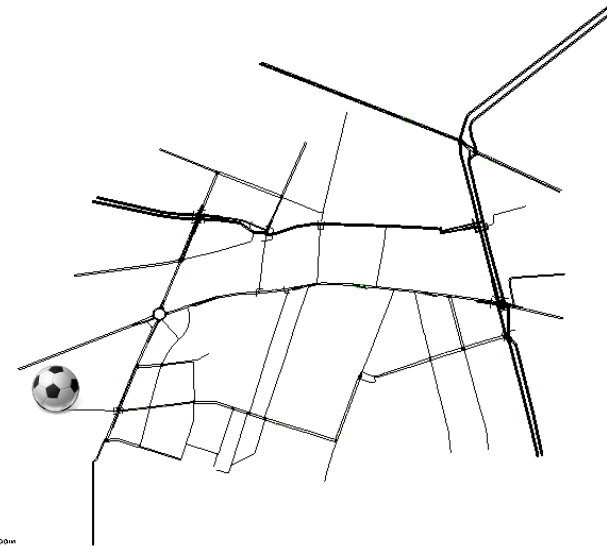
# Bologna Scenarios



- 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

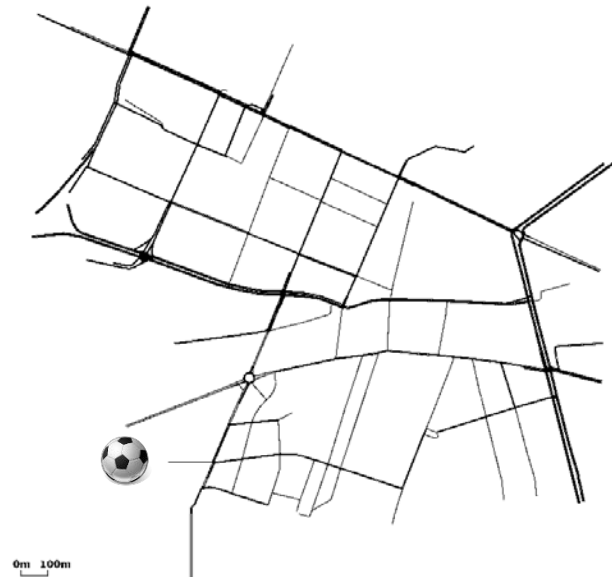
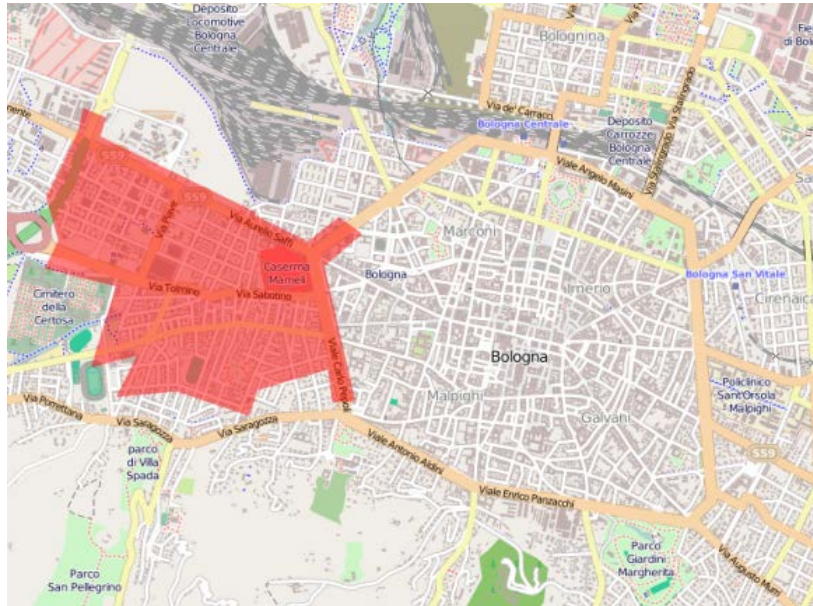


- VISSIM Network
- Peak hour traffic demand (8am- 9am)
- Simulate big events such as football matches or concerts





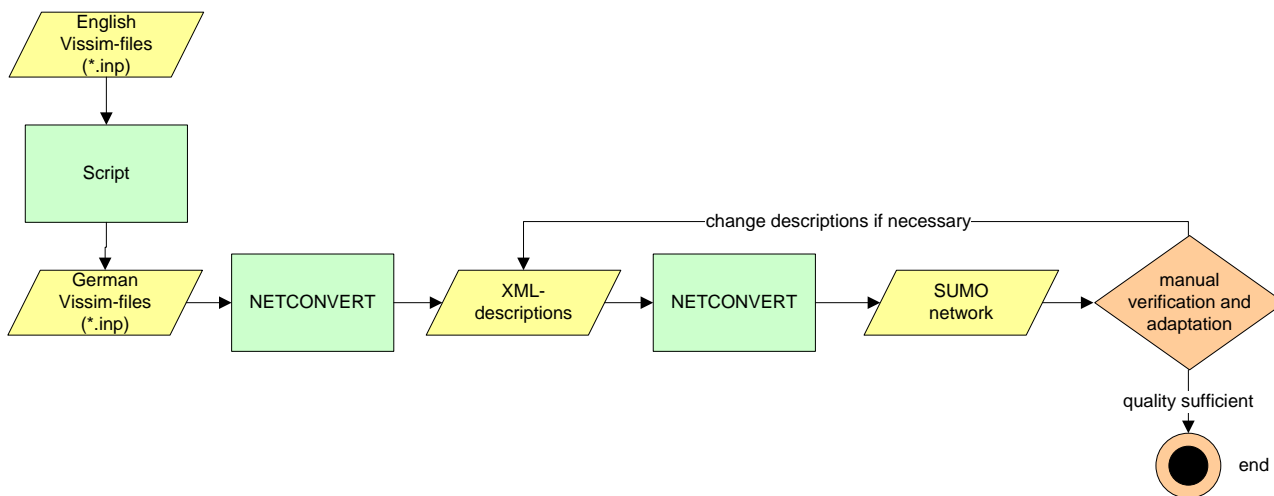
### 3. Andrea Costa and Pasubio joined scenario



- Andrea Costa and Pasubio scenario are overlapping
- Create one scenario based on both



# 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

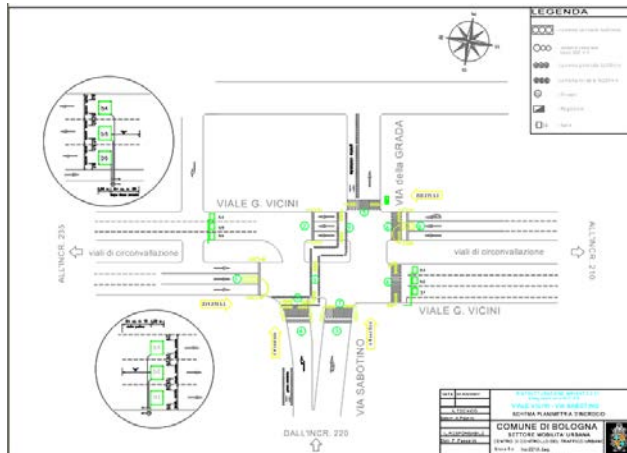






# Development of the Scenario: Traffic lights

- 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			
11	5													21	16			
12	6													16	22			
13	7													33	18			
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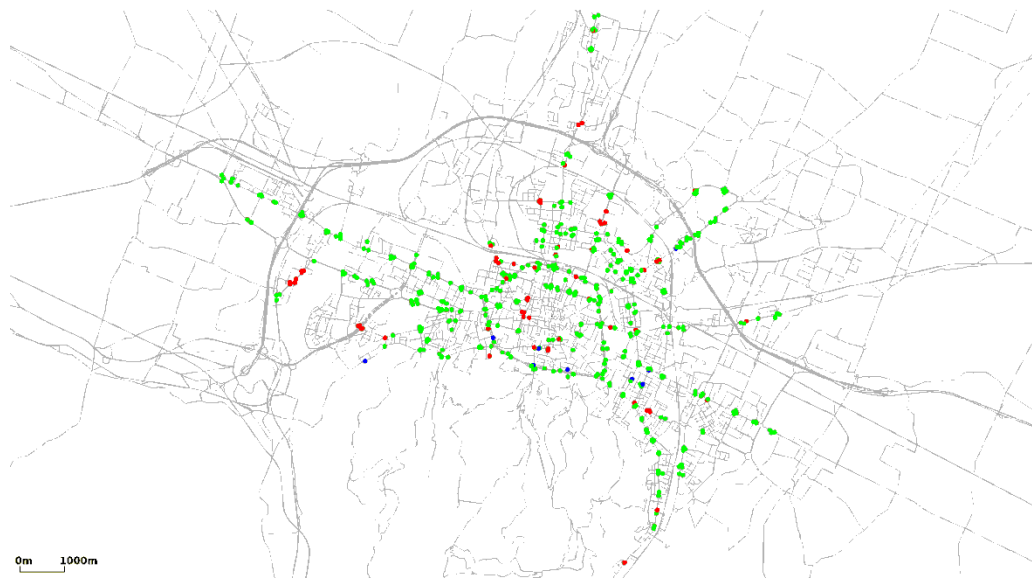
■ red light for vehicles/pedestrians  
■ amber light for vehicles/pedestrians  
■ green light for vehicles/pedestrians  
■ amber flashing light for vehicles  
■ green flashing light for pedestrians  
■ Variable phases



## 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

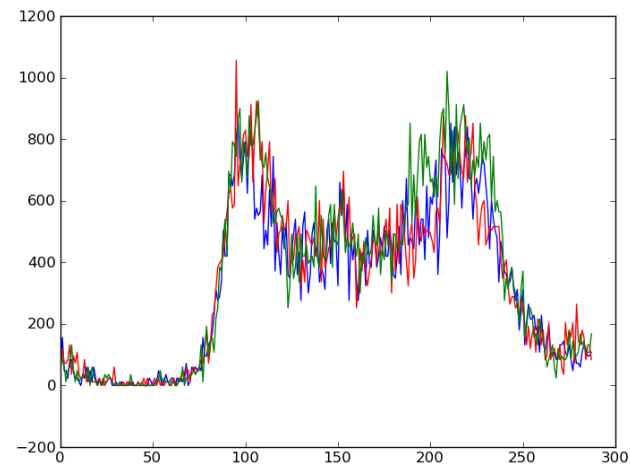


## Development of the Scenario: Traffic Demand

- 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



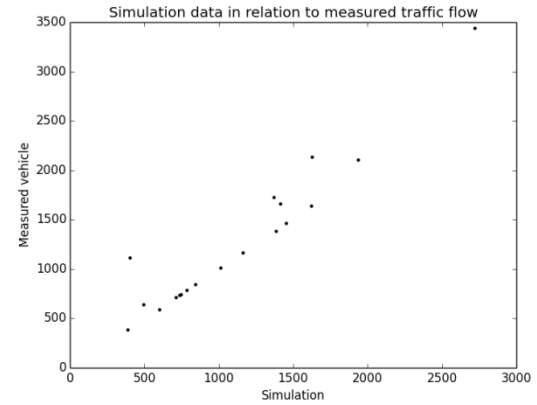
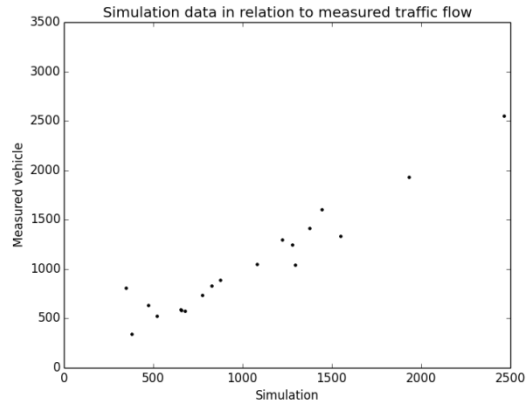
Example traffic flow of three days;  
blue: 11.11., red 12.11., green: 13.11.



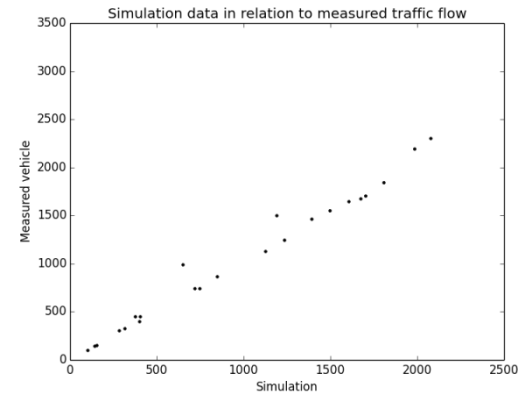
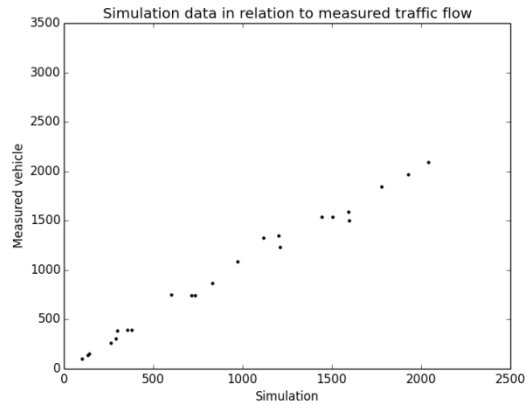
## one hour

## whole simulation

A. Costa



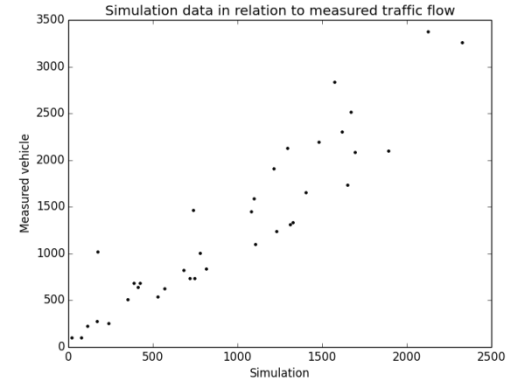
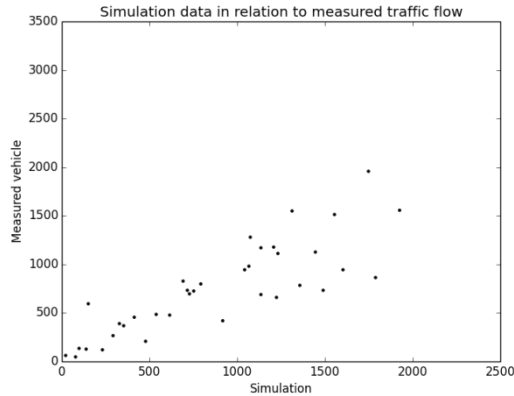
Pasubio



## one hour

## whole simulation

Joined



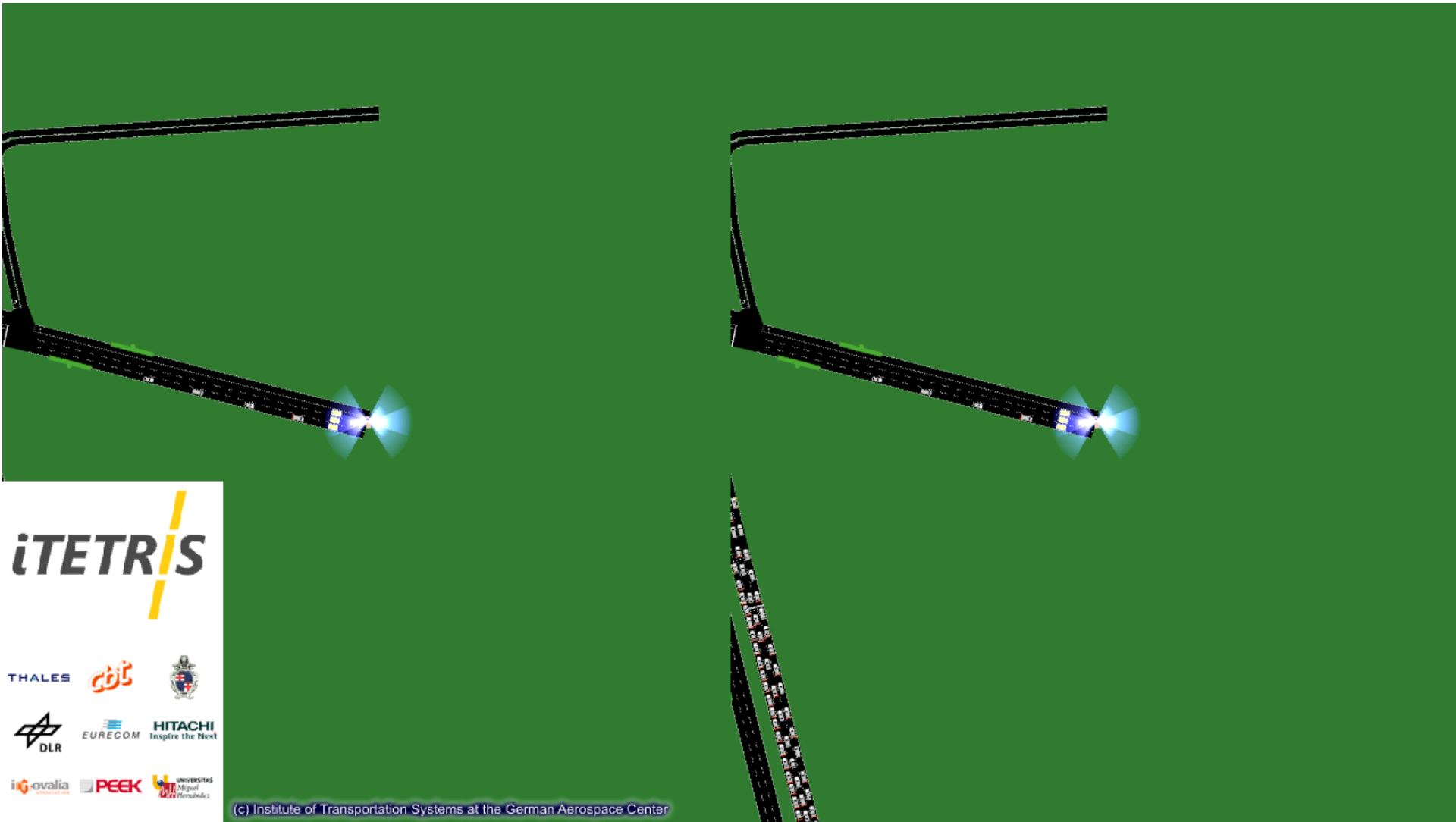
- SUMO has problems to simulate larger scenarios within one hour
- Known problem: traffic simulations need a warm-up period to fill the network, before a realistic network state is reached



# 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









## Further Work

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



# Questions? Comments?

