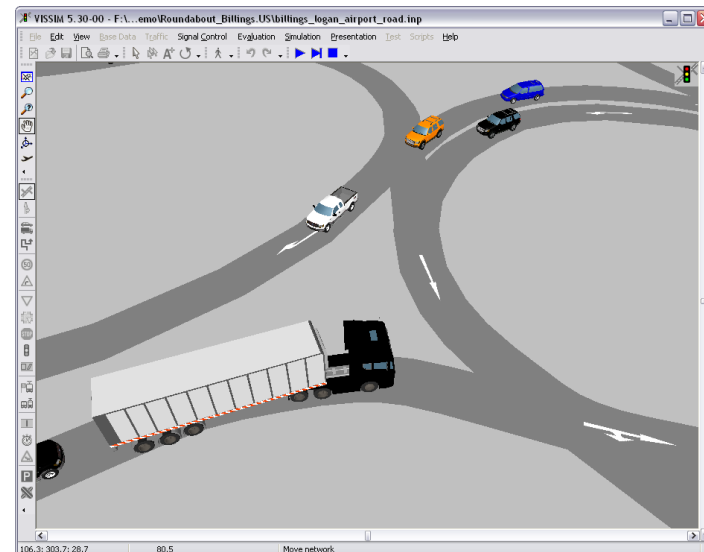
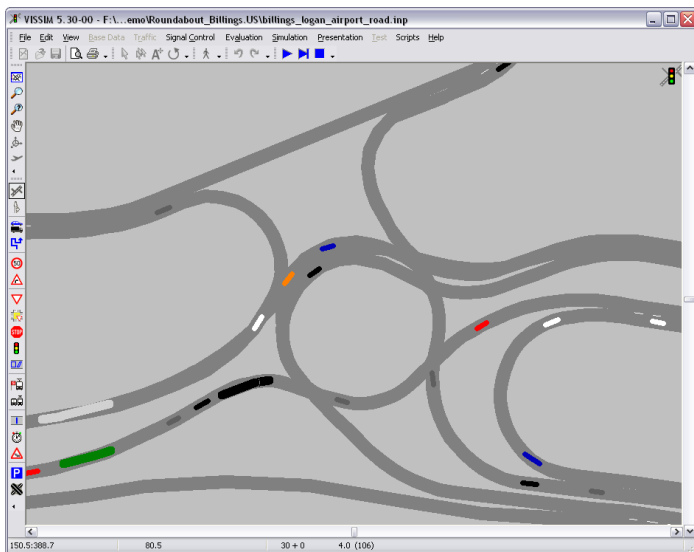


Introduction to VISSIM Simulation

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The Objective of this tutorial

- To understand and Planning in VISSIM
- Simulation Setting
- Menu and Toolbars
- Links and Connections
- Vehicle Input
- To understand Routing
- To understand Conflict Areas
- To understand Traffic Signal
- To understand Pedestrian Simulation
- Driver Behavior Settings

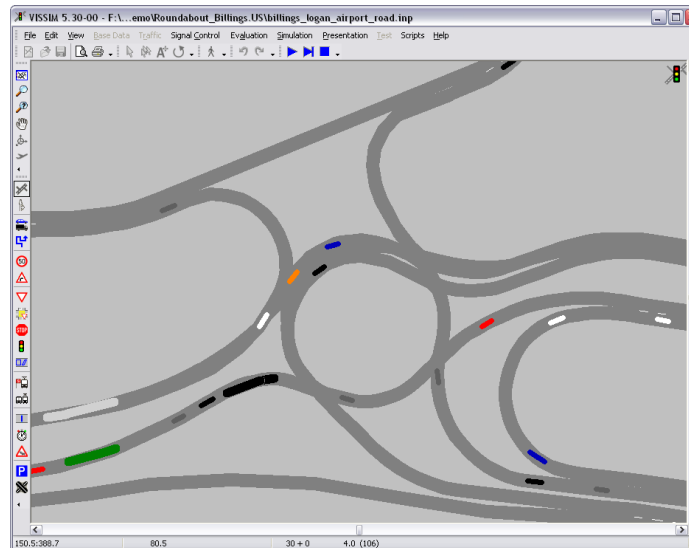
Microscopic Simulation

“Microscopic simulation”, which is called also microsimulation, means that each entity (car, train, person) of reality that is to be simulated is simulated individually, i.e. it is represented by a corresponding entity in the simulation, thereby considering all relevant properties.

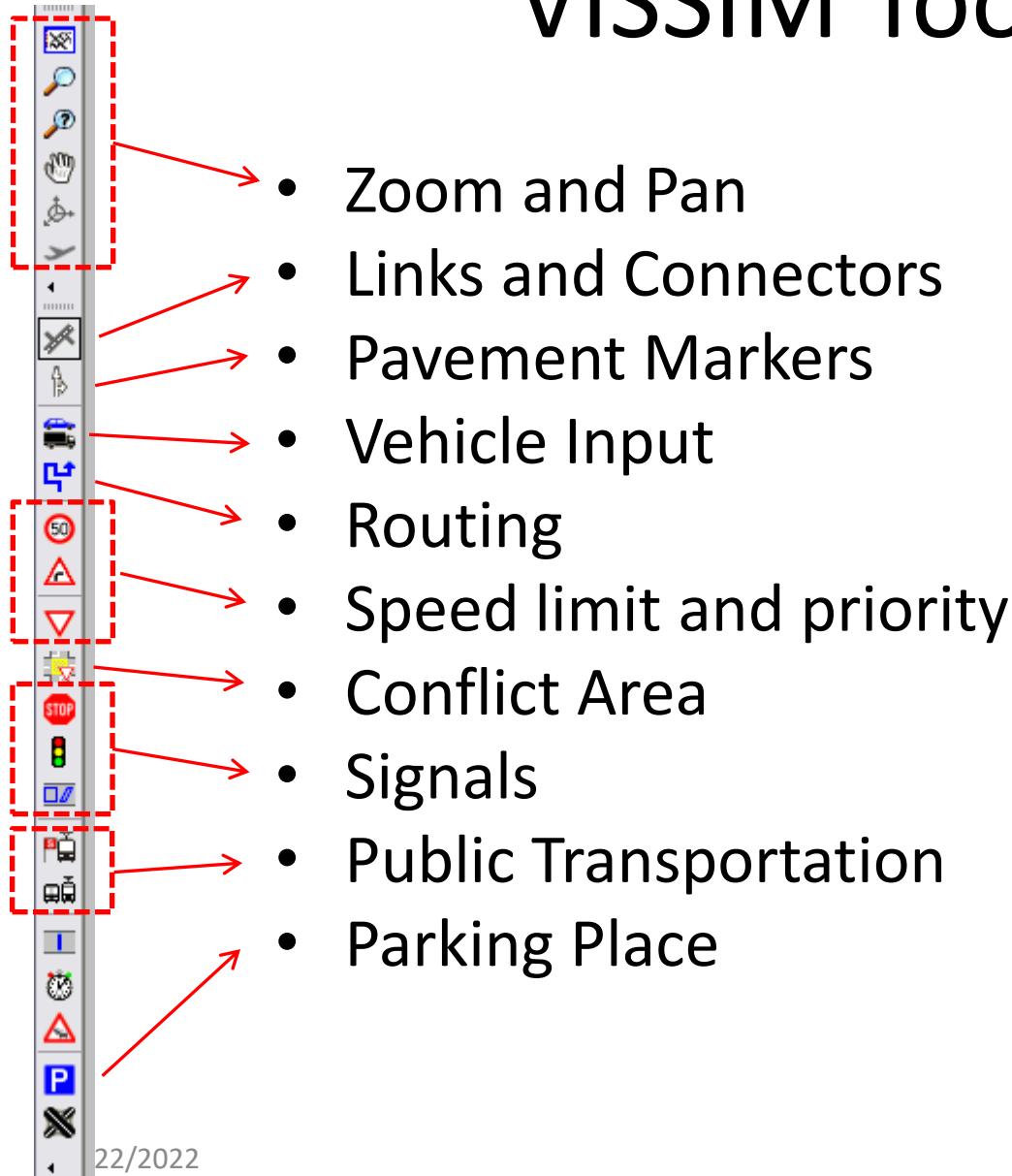
The same holds for the interactions between the entities. The opposite would be a “macroscopic simulation”, in which the description of reality is shifted from individuals to “averaged” variables like flow and density. The corresponding product from the same manufacturer is called VISUM.

What is VISSIM ?

- VISSIM is a microscopic multi-modal traffic flow simulation software. It is developed by PTV (Planung Transport Verkehr AG) in Karlsruhe, Germany. The name is derived from “Verkehr In Städten - SIMulationsmodell” (German for “Traffic in cities - simulation model”). VISSIM was started in 1992 and is today a global market leader.

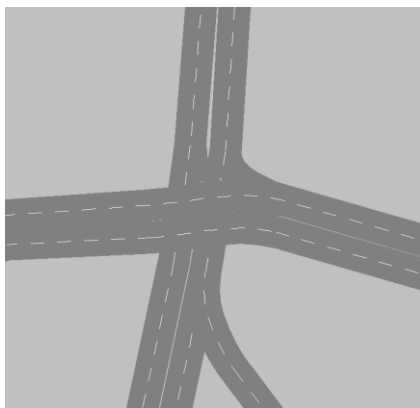


VISSIM Toolbars

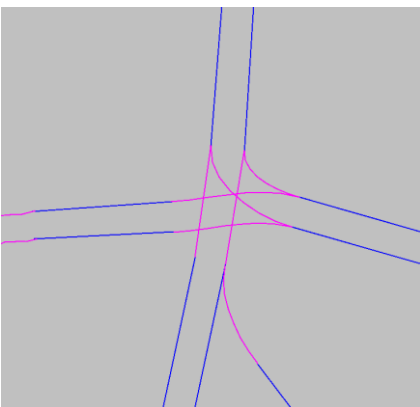


Display Option

- In this form, we are able to configure visualization parameter, vehicle color, 3D background, Language and Unit.



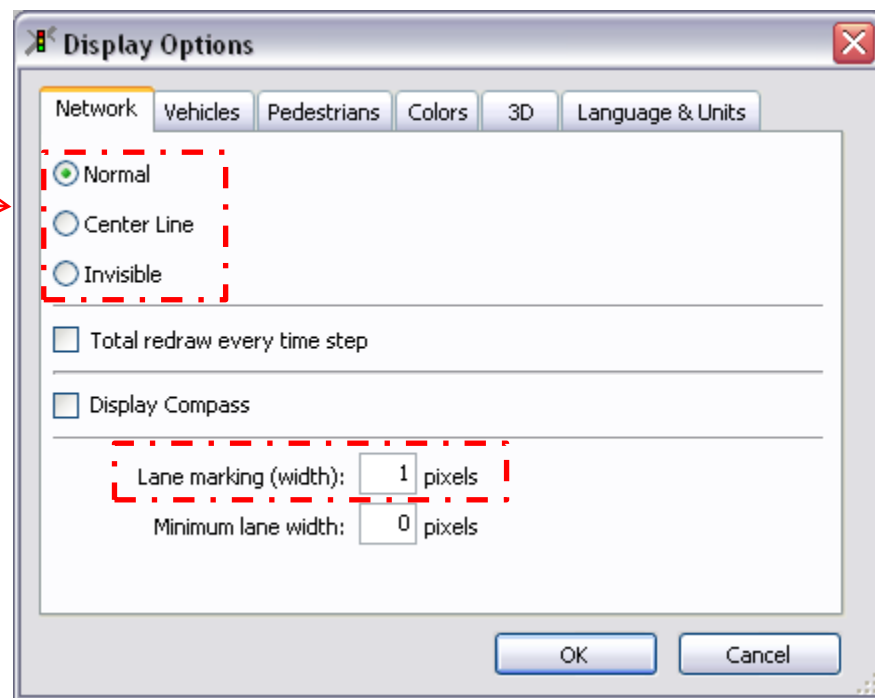
Normal View



Center Line

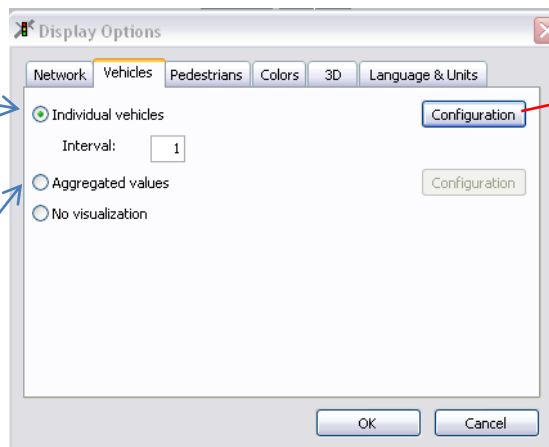
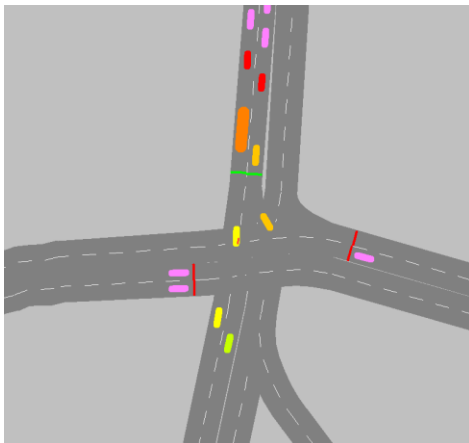
Menu **View** → **Option**

Ctrl + A



Vehicle Display

- This option provided for visualization of road users and for display of compiled data gained from vehicular or pedestrian traffic are almost alike for vehicles on links and pedestrians on areas and ramps or stairways.

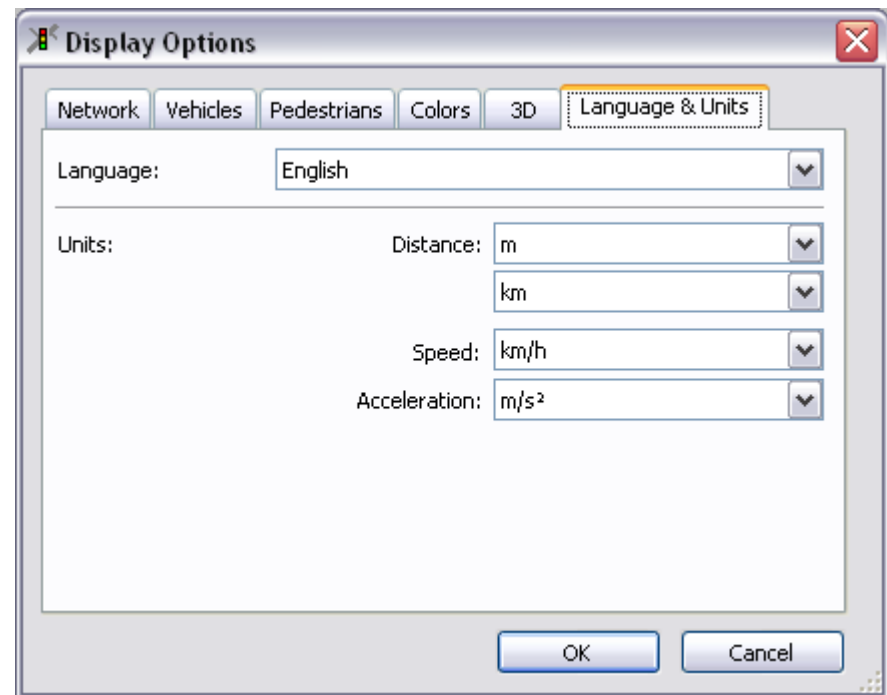


Language and Units

Language: Select the language from those provided with the VISSIM installation.

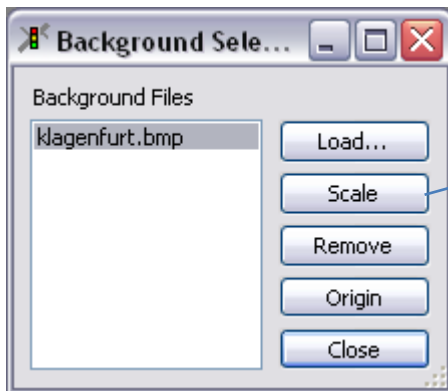
Units: Select either metric or imperial units for the following parameters:

- Distance
- Speed
- Acceleration

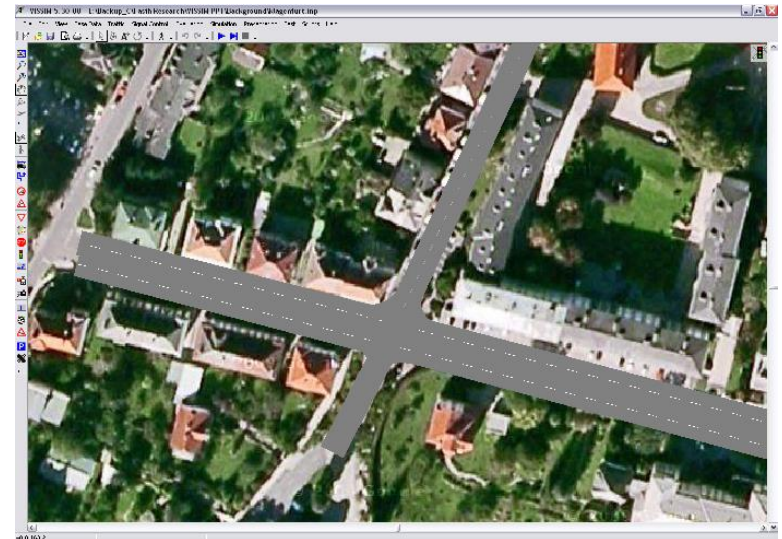


Background

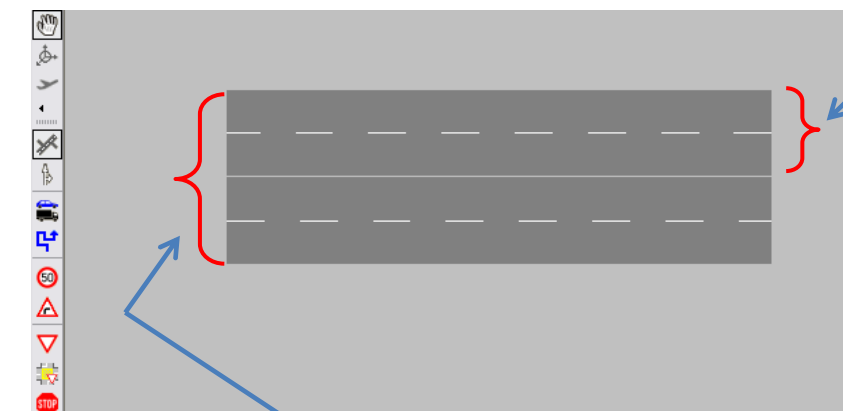
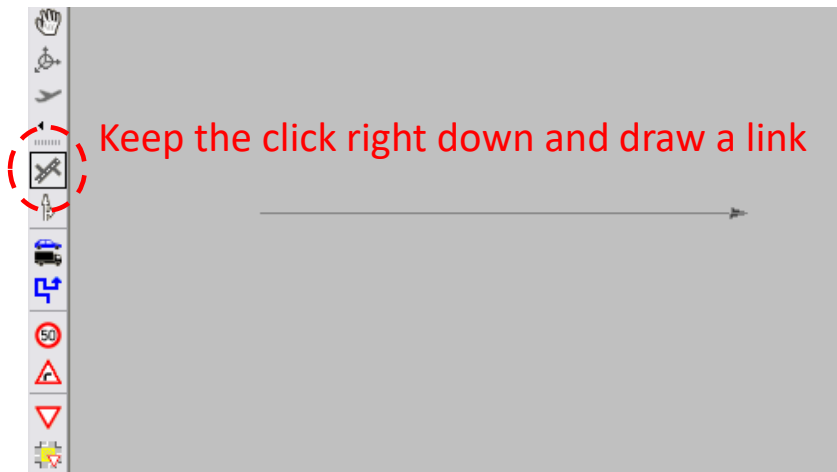
- Building an accurate VISSIM model from scratch requires at least one scaled map that shows the real network. The image file of a digitized map can be displayed, moved and scaled in the VISSIM network window and is used to trace the VISSIM links and connectors.
- View **Background** → **Edit**



Calibration Tool



Links and Connectors



Link Data

No.: 1 Name:

No. of Lanes: 2 Behavior type: 1: Urban (motorized)

Link Length: 44.642 m Display type: 1: Road surface gray

Lanes Display Other

Lane width: 3.50 m

Various Lane Widths...

Lane Closure...

No Lane Change...

Change Direction

☒ Generate opposite direction

No. of Lanes: 2

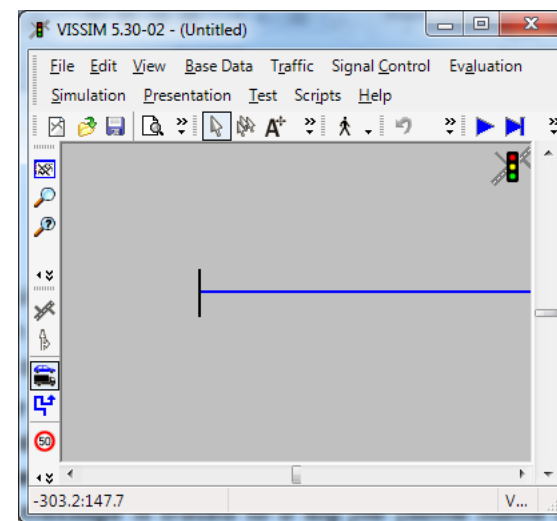
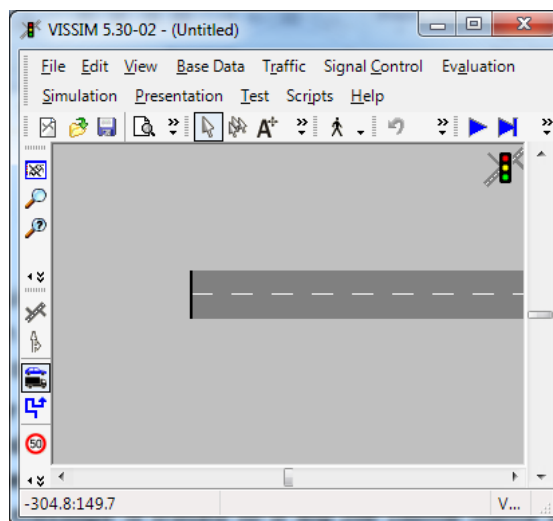
☐ Use as pedestrian area

OK Cancel

Vehicle Inputs

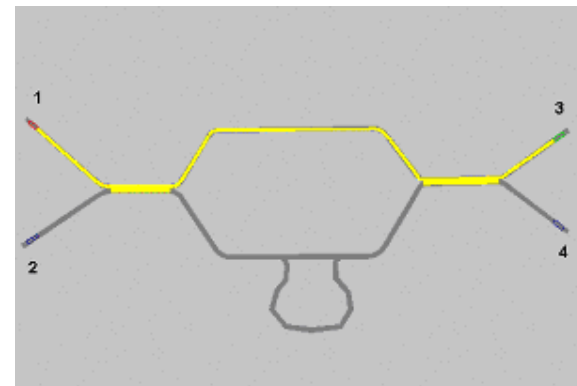


- For traffic simulation in VISSIM at least one vehicle should be in the links. This option should activate at the free head of each link. The main parameter of this item is rate of generating vehicles.
- ***Note: If the defined traffic volume exceeds the link capacity the vehicles are 'stacked' outside the network until space is available again. If any 'stacked' vehicles cannot enter the network within the defined time interval, a message is traced to a log file (same name as input file with extension *.ERR) indicating also the time interval of the particular input.***



Routes

- Normally vehicles can not switch to another path or different road. Therefore we need a routing system. First we must define a physical link connections and interconnection between the origin point and destination and after that can choose a routing method. Each route can conduct the specific amount of traffic on each paths.
- In VISSIM we have static and dynamic routing.



Definition:

A route is a fixed sequence of links and connectors:

- ▶ from the routing decision point (red cross-section)
- ▶ to at least one destination point (green cross-section).

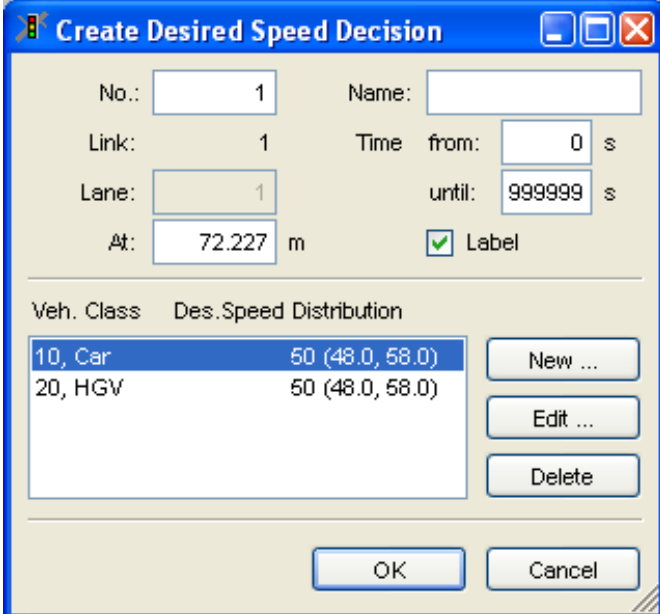
Each routing decision point can have multiple destinations resembling a tree with multiple branches.

Desired Speed Decisions

A desired speed decision is to be placed at a location where a permanent speed change should become effective (i.e. change of desired speed). Each vehicle gets a new speed from the relevant speed distribution as it crosses over the desired speed decision. Only then it reacts to the new speed - either by acceleration or deceleration according to the particular acceleration / deceleration function.

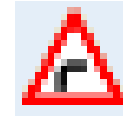
Definition:

- 1. Select the Desired speed decisions mode.
- 2. Select the link/connector where the desired speed decision should occur.
- 3. Right click at the location of the speed decision on the selected link (decision point).
The Create desired speed decision window opens.
- 4. For each vehicle class passing that link/connector select the appropriate new speed distribution.
- 5. Confirm OK.

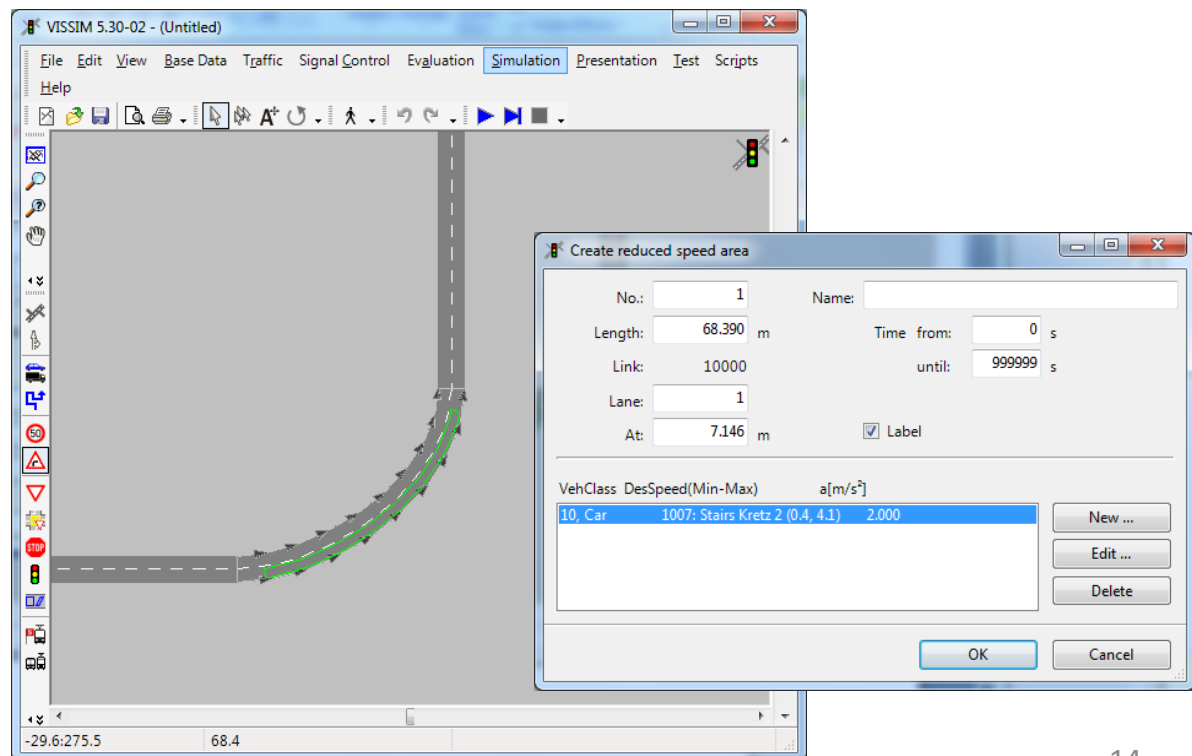


Veh. Class	Des. Speed Distribution
10, Car	50 (48.0, 58.0)
20, HGV	50 (48.0, 58.0)

Reduced Speed Area

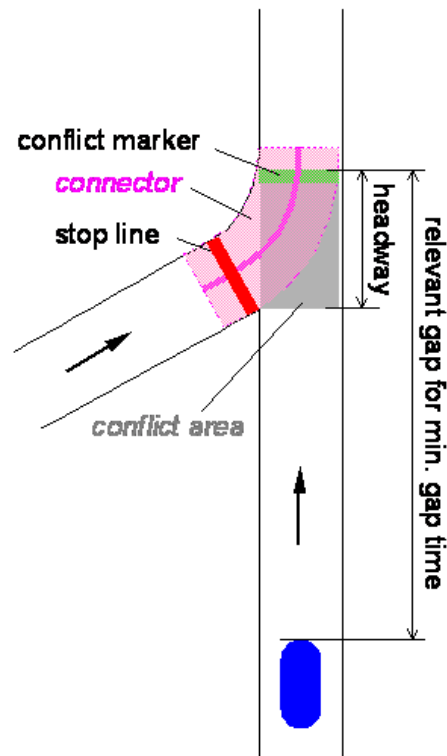


- Reduced speed areas are typically used for curves (e.g. turning movements). Thus they are normally placed on connectors rather than links.
- For multi-lane links reduced speed areas need to be defined for each lane separately.

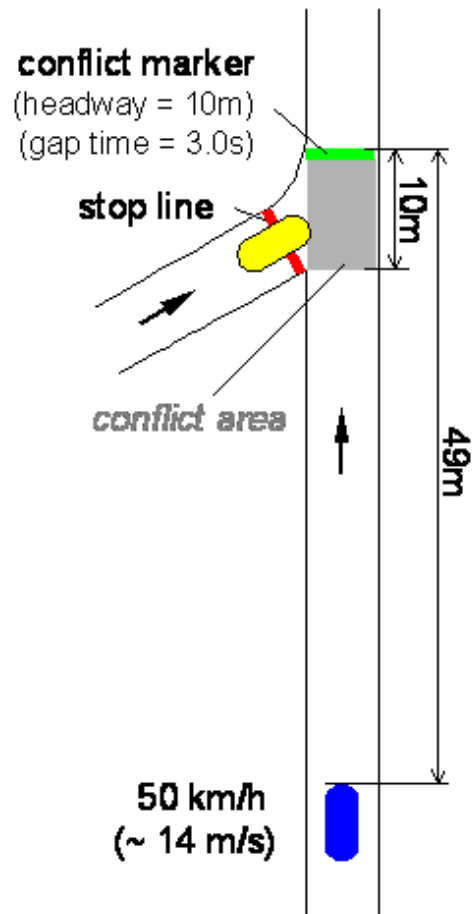


Priority Rules

- The right-of-way for non-signal-protected conflicting movements is modeled with priority rules. This applies to all situations where vehicles on different links/connectors should recognize each other. Vehicles within the same link will implicitly see each other, even if the link has multiple lanes.



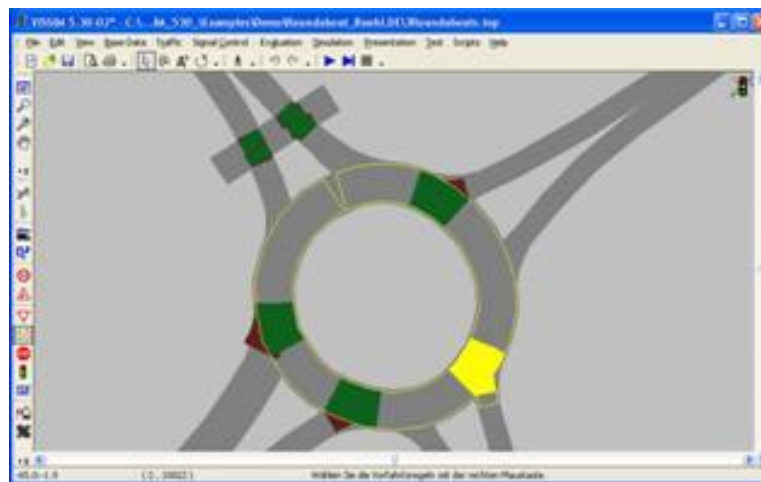
Priority Rules



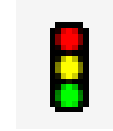
The blue vehicle traveling on the main road at 50km/h (i.e. $\sim 14\text{m/s}$) is 49m upstream of the conflict marker. The current gap time is $49\text{m} / 14\text{m/s} = 3.5\text{s}$. Thus the yellow vehicle (on the minor road) can still pass, because the min. gap time is set to 3.0s.

Conflict Areas

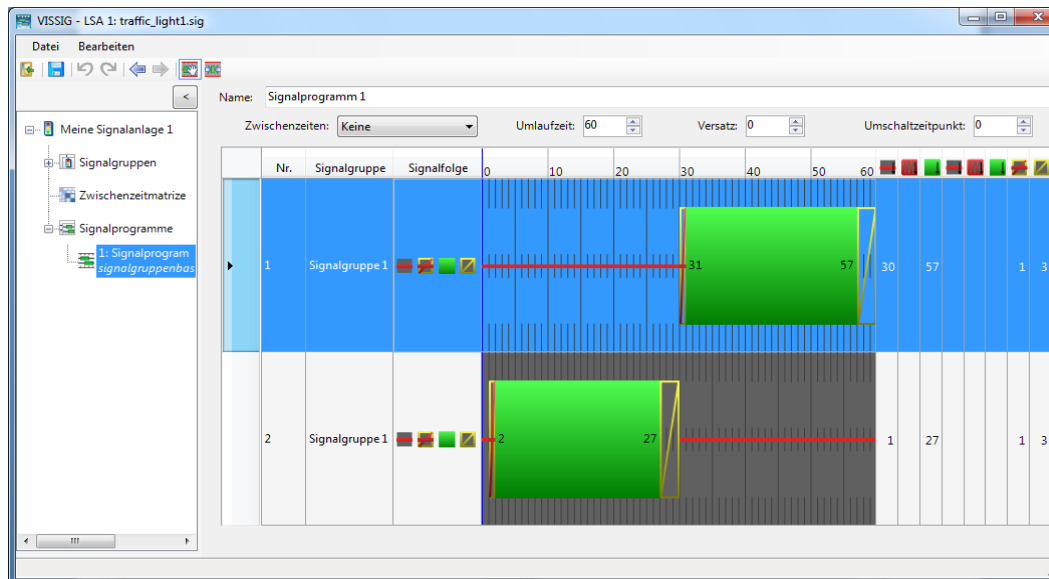
- Conflict areas are a new alternative to priority rules to define priority in intersections. They are the recommended solution in most cases because they are more easily defined and the resulting vehicle behavior is more intelligent.
- ***Note: A conflict area can be defined wherever two links/connectors in the VISSIM network overlap. For each conflict area, the user can select which of the conflicting links has right of way (if any).***



Signal Heads

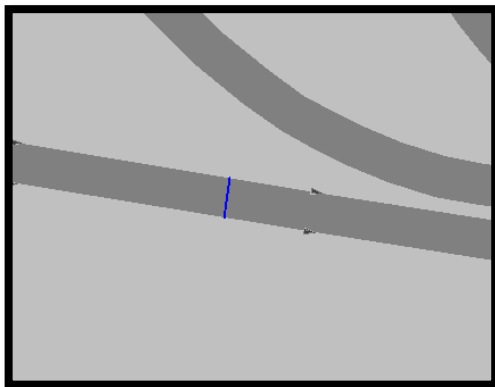


- In VISSIM every signal controller (SC) is represented by its individual SC number and signal groups (also referred to as signal phase) as its smallest control unit. Depending on the selected control logic, VISSIM can simulate up to 125 signal groups per signal controller. VISSIM also discriminates between signal groups and signal heads.



Data Collection Points

- Data collection offers the collection of data on single cross sections rather than a section or segment.



Data Collection Point

No.: 9312

Name:

☒ Label

Link: 10004

Lane: 2

At: 2.655 m

OK Cancel

Evaluations (File)

Vehicles Signal Control Pedestrians

☐ Observer

☐ Export: Configuration

☐ Vehicle record: Configuration Filter

☐ Nodes: Configuration Filter

☒ Data collection: Configuration

☐ Network performance: Configuration Filter

☐ PT waiting time

☐ Travel times: Configuration

☐ Lane change: Filter

Configuration Filter

Configuration

Configuration

Configuration

Configuration Filter

Configuration

Configuration

Configuration

OK Cancel

Data Collection - Configuration

Layout of columns

Number Veh / all veh. types

Up Down

New entry

Parameter	Function	Vehicle Class
Accel.	Minimum	all veh. types
Distance	Maximum	1 All Vehicles
Length	Mean	10 Car
Number Veh		20 HGV
Occup. Rate		30 Bus
Persons		40 Tram
QueueDel.Tm.		50 Pedestrian
Speed		60 Bike

Class bounds:

Number of Vehicles / All Vehicle Types

Configuration file: billings_logan_airport_road.qmk

OK Cancel

Sample for Data Collection Points

- Data Collection (Raw Data)
-
- File: C:\PTV_Vision\VISSIM520-08 (32 Bit)\Examples\Training\SignalControl\LRT-Luxembourg.FixedTime\Manual.inp
Comment: Luxembourg with SC 5,6 (fixed time)
Date: Donnerstag, 8. April 2010 17:27:30
VISSIM: 5.20-09* [23371:23374]
-
- Simulation Start Time: 2010-04-08 15:45:00
-
- Data Collection Point 4131: Link 10287 Lane 1 at 0.697 m, Length 0.000 m.
- Data Collection Point 4311: Link 303 Lane 1 at 1.588 m, Length 0.000 m.
- Data Collection Point 5191: Link 237 Lane 1 at 29.741 m, Length 0.000 m.
- Data Collection Point 5192: Link 237 Lane 2 at 29.347 m, Length 0.000 m.
- Data Collection Point 5321: Link 243 Lane 1 at 18.409 m, Length 0.000 m.
- ...
- Data C.P. t(enter) t(leave) VehNo Type Line v[m/s] a[m/s²] Occ Pers tQueue VehLength[m]
- 6211 15.45 -1.00 3 100 0 12.0 -1.35 0.05 2 0.0 4.48
- 6211 -1.00 15.83 3 100 0 11.5 -1.35 0.03 2 0.0 4.48
- 6211 17.92 -1.00 5 100 0 11.8 -1.06 0.08 1 0.0 4.11
- 6211 -1.00 18.28 5 100 0 11.4 -1.06 0.08 1 0.0 4.11

Driver Behavior

- By this feature and options we can change the driver behaviors.
- Both the car following and lane change models in VISSIM use an extensive range of parameters. Some of these may be adapted by the experienced user to change basic driving behavior.
- Some Important Features and Options:
 - Car Following
 - Lane Change
 - Lateral
 - Signal Control

Driver Behavior

Driving Behavior Parameter Sets

No.	Name
1	Urban (motorized)
2	Right-side rule (motorized)
3	Freeway (free lane selection)
4	Footpath (no interaction)
5	Cycle-Track (free overtaking)
6	Urban HGV / Rancher

No.: 1 Name: Urban (motorized)

Following Lane Change Lateral Signal Control

Look ahead distance

min.: 0.00 ft

max.: 820.21 ft

4 Observed vehicles

Look back distance

min.: 0.00 ft

max.: 492.13 ft

Temporary lack of attention

Duration: 0.00 s

Probability: 0.00 %

Car following model

Wiedemann 74

Model parameters

Average standstill distance: 6.50

Additive part of safety distance: 2.00

Multiplic. part of safety distance: 3.00

OK Cancel

Driver Behavior

Driving Behavior Parameter Sets

No.	Name
1	Urban (motorized)
2	Right-side rule (motorized)
3	Freeway (free lane selection)
4	Footpath (no interaction)
5	Cycle-Track (free overtaking)
6	Urban HGV / Rancher

No.: 1 Name: Urban (motorized)

Following **Lane Change** Lateral Signal Control

General behavior: Free Lane Selection

Necessary lane change (route)	Own	Trailing vehicle
Maximum deceleration:	-13.12 ft/s ²	-9.84 ft/s ²
- 1 ft/s ² per distance:	100.00 ft	100.00 ft
Accepted deceleration:	-3.28 ft/s ²	-3.28 ft/s ²

Waiting time before diffusion: 60.00 s

Min. headway (front/rear): 1.64 ft

To slower lane if collision time above: 0.00 s

Safety distance reduction factor: 0.60

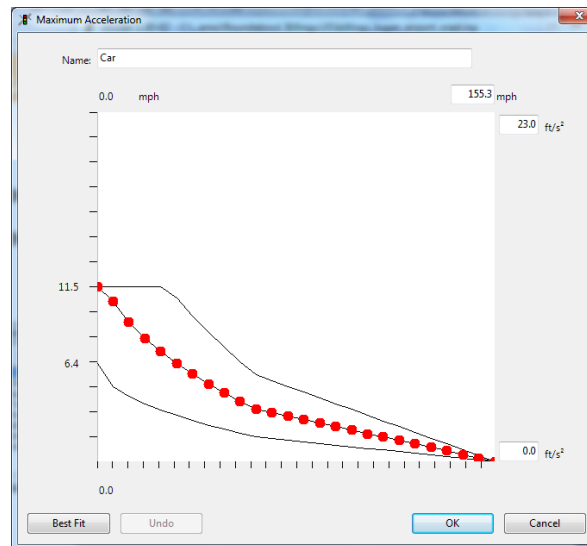
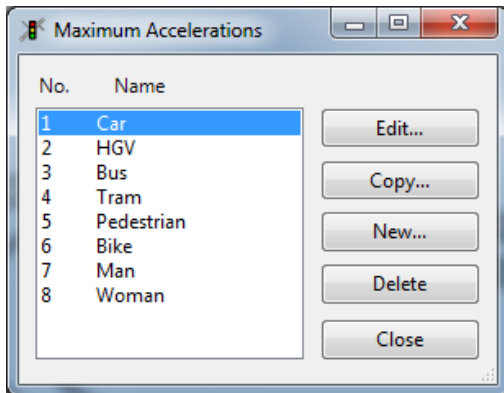
Maximum deceleration for cooperative braking: -9.84 ft/s²

Overtake reduced speed areas: ☐

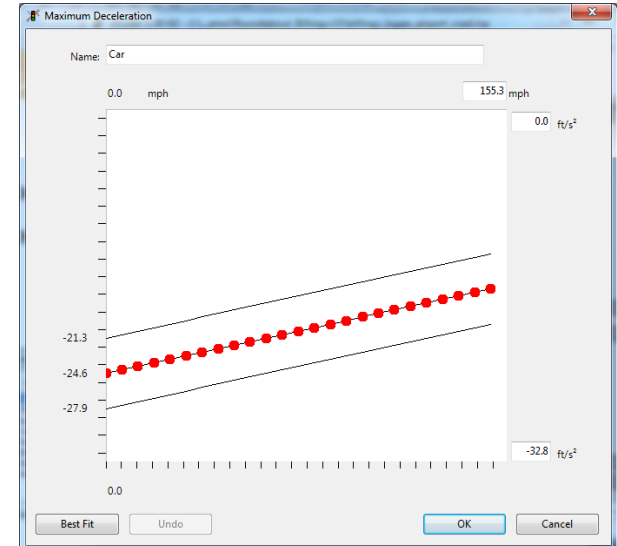
OK Cancel

Base Data Function

- VISSIM does not use a single acceleration and deceleration value but uses functions to represent the differences in a driver's behavior. Acceleration and deceleration are functions of the current speed.



Car Acceleration



Car Deceleration

VISSIM Tutorial

Thank you very much for your attention