

Data recording for the traffic microsimulation package VISSIM

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Abstract

This article is about first experience of traffic microsimulation in Irkusk basing on the program “Vissim” (PTV Germany).

VISSIM is a micro simulation software for analyzing both existing and and designed traffic networks. The feature of this software VISSIM enabling more detailed models than other microscopic traffic program. The are many applications of this software

- Comparison of junctions with regard of design alternatives (roundabouts, unsignalized and signal controlled; grade separated interchanges)
- Design, test and evaluation of vehicle-actuated signal control operations
- Capacity analysis and testing of transit priority schemes including signal priority
- Analysis of toll plaza facilities
- Traffic impact studies
- Operability of ramp metering and interchange design
- Analysis of ITS applications such as route guidance systems and variable message sign systems

VISSIM has different tools of network editing:

- Editing of networks based on background maps such as design plans and aerial photography

- Definition of stochastic elements such as distributions of desired speed, and acceleration rates, and car following behavior
- User definable vehicle types such as different car configurations, trucks, trailers, buses, articulated buses, trams with single or multiple cars, bicyclists and pedestrians
- Various network objects to model the road infrastructure (multi-lane streets, railway tracks, variable message signs, yield signs, signal heads, stop signs, detectors, bus bays, LRT stations, parking lots, etc.)
- Import filter from *ptv transportation* VISUM of origin-destination matrices, partial road networks including all link attributes and routes.

In this context the quality of the traffic modeling is depending on the quality of the input data. So during traffic studies of the Irkutsk city center (May-June 2004) we specially considering the data recoding problem. The task was to provide the data corresponding with VISSIM abilities.

The basic work depends on traffic counting you can make manually with e.g. people (observers) to count the traffic. More efficient way is to make the video records which you can treat as AVI files for further study. In this way you can get the comprehensive data about volumes, traffic fractions (cars, trucks, buses and etc), speed, gaps, flows distributions and turning movements, driver's behaviour. During this study we are using 15 minutes video records per intersections and treatment software written by A. Levashev. The study was made in "site by site" manner and the day period of recording was evening peak hours (17.00-18.00). The treated data storing as AVI files and ready for any repeatable searches.

After counting the actual traffic volumes you have to produce an O/D Matrix, what means a matrix for the origin and the destination of traffic counted on car units per one hour (see table 1)

Table 1.

Traffic counts 1994

| to from | A | B | C | D | E | incoming |
|------------|-----|---|-----|-----|-----|----------|
| A | | | 164 | 611 | 32 | 807 |
| B | | | | | | 0 |
| C | 287 | | | 214 | 117 | 618 |
| D | 372 | | 74 | | 62 | 508 |
| E | | | 166 | 59 | | 225 |
| outgoing | 659 | 0 | 404 | 884 | 211 | 0 |

Traffic counts 2004

| to from | A | B | C | D | E | incoming |
|------------|------|-----|-----|------|-----|----------|
| A | | 8 | 99 | 1241 | 195 | 1543 |
| B | 4 | | 5 | 16 | 12 | 37 |
| C | 503 | 29 | | 172 | 104 | 808 |
| D | 566 | 142 | 57 | | 9 | 774 |
| E | 21 | 112 | 23 | 277 | | 433 |
| outgoing | 1094 | 291 | 184 | 1706 | 320 | 0 |

If you have such type of matrix you can make a forecast for future traffic depending on VISSUM modelling or former counting and same proposed trends.

Work with „PTV Vissim“

The first step you have to do is to get a scaled map of the planning area you want to work on. You have to load it into “Vissim” as raster backcloth. The next step is to input the information about the number of lines on this part of street (see fig. 1) using graphic network redactor. After building the network you have to add priority of some flows and not depending on signalisation. Third stage is to set the information about signalisation (timing), it is very important in case of simulating of the existing network.



Fig 1. The run of simulation of the signalised intersection Lenina St.-Sedova St. (Irkutsk)

Next step is to add the amount of traffic going into each intersection of network; also you have to add the number of car units going to different directions. In the same manner you can add for public transportation the number of passengers and different time tables of delay times what is very important when public transport is driving on the same road like individual traffic.

VISSIM has a lot of various outputs enabling different ways of presentations of the traffic performance:

- data files containing measures of (e.g. volumes, speed, delays, queue lengths and etc.)
- emission calculation
- detailed printouts of the different simulation runs
- 2D and 3D visualization of the traffic

So this program can display everything you can even imagine to know about traffic, the only problem about the exact output of data is the information you can collect (see fig. 2).

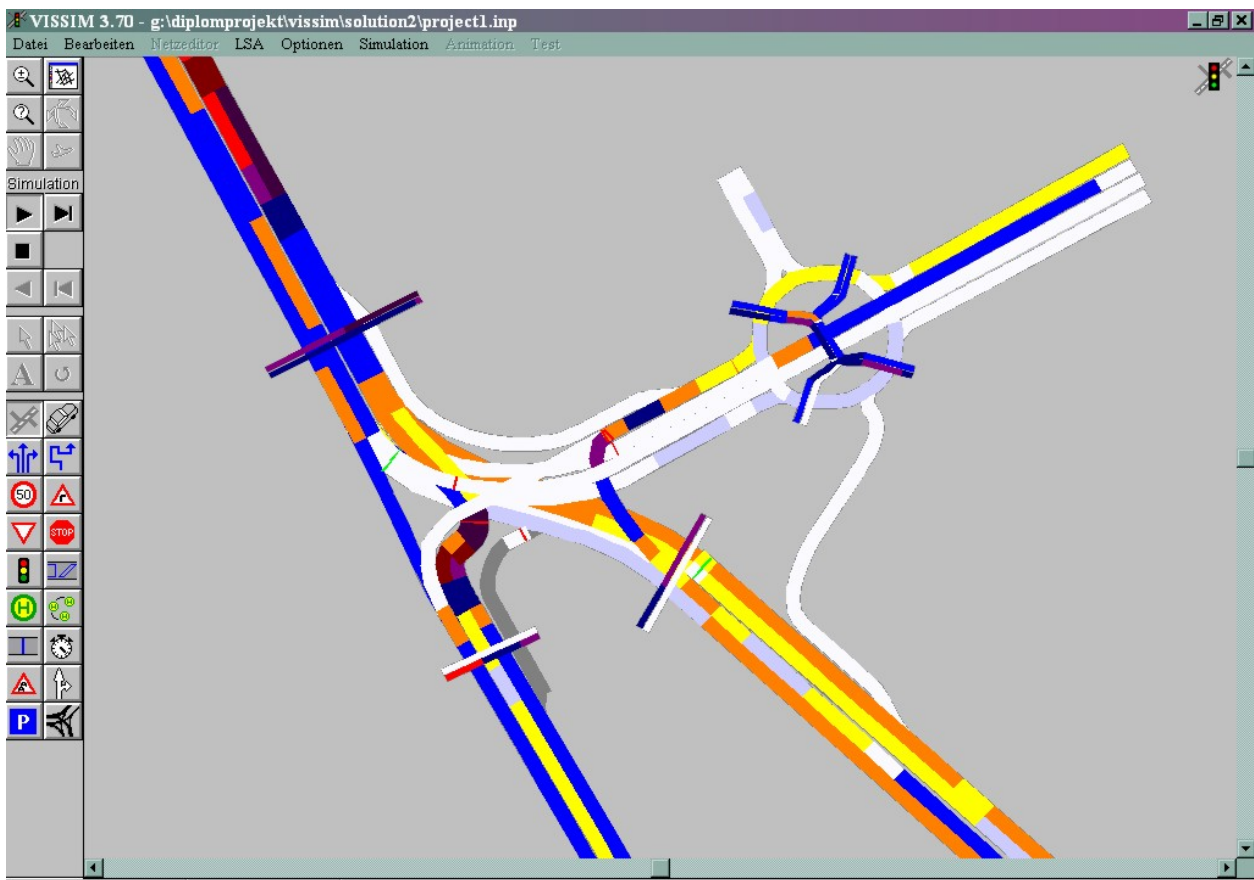


Fig 2. The graphic analysis of traffic performance at the signalized intersection

So without any doubt the software “PTV- Vissim” is a powerful system to simulate existing and future traffic patterns. The real problem for using this software is to get comprehensive information for simulation.