State Of Palestine
Ministry Of Transport

Training of Trainers Workshop

on Traffic Impact Studies of Commercial Buildings and Facilities in Palestinian Cities.

30 November 2020 – 3 December 2020

Economic and Social Commission for Western Asia

UNITED NATIONS
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DATA COLECTION

Eng. Rayane Wehbe

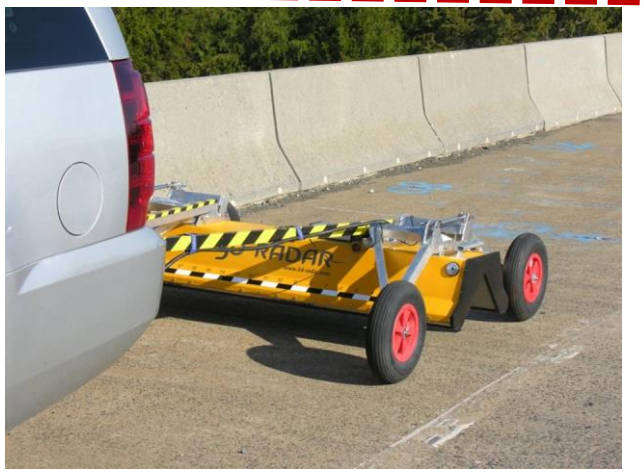
TOOLS TO BE USED

STUDY INPUTS & SURVEYS

Traffic Survey

Drivers behavior

Demographic Survey



Road Inspection

Users opinion

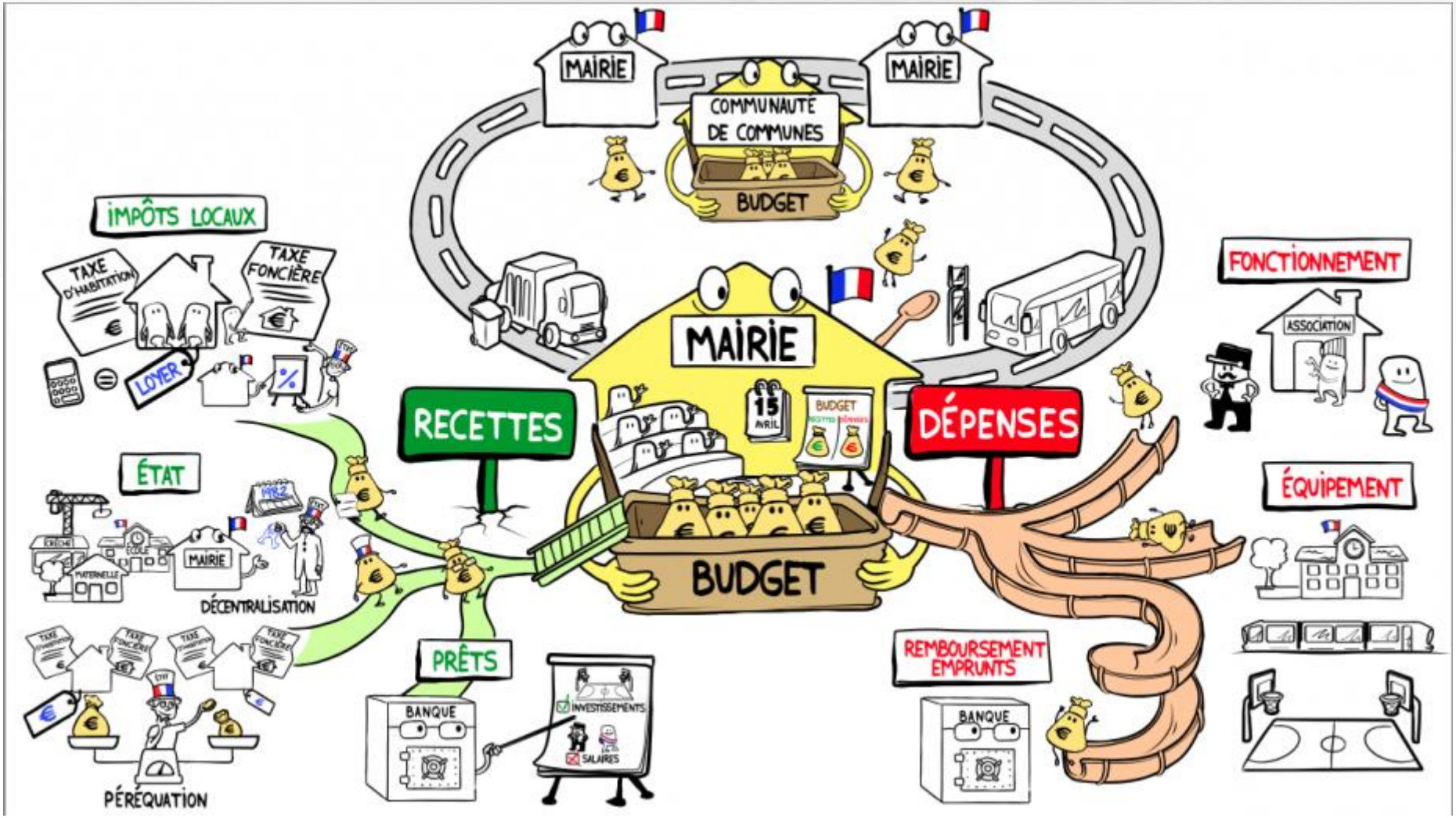
IMPORTANCE OF DATA COLLECTION

- Data Collection are basic requirements for planning of road development and management schemes.
- It is important to have an accurate overview of the existing situation (base case) and to be able to predict the feasibility and consequences of planned measures.
- Availability and quality of input data are contributing to optimize decisions and adequate solutions.

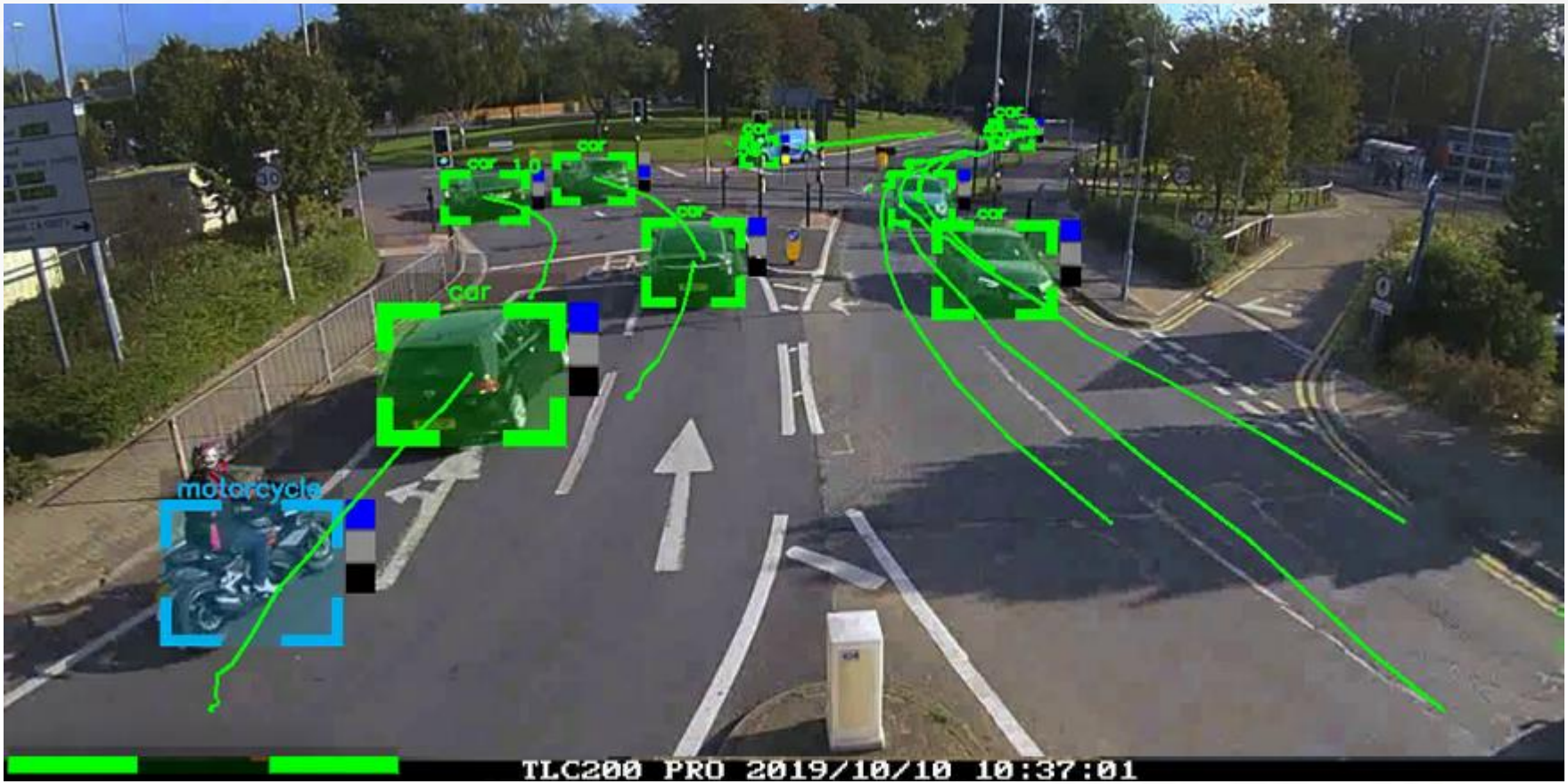
DEMOGRAPHIC, SOCIO-ECONOMIC STATISTICS

- Population and demographic development during the last ten years
- Active and inactive population
- Income categories
- Gross Domestic Production GDP
- Socio-economic indicators and urban development

DEMOGRAPHIC, SOCIO-ECONOMIC STATISTICS



TRAFFIC SURVEYS



TYPES OF TRAFFIC SURVEYS

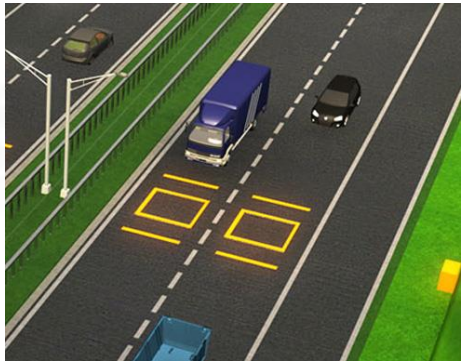
- Classified Traffic Volume Counts Survey
- Intersection Turning Movement Survey
- Origin-Destination Survey
- Speed & Delay Survey
- On-Street & Off-Street Parking Surveys
- Pedestrian Survey
- Public Transport on-board Survey
- Stated preference survey
- Household Survey

MANUAL TRAFFIC COUNTS

- The most common method of collecting traffic flow data is the manual method, which consist of assigning a person to record traffic volumes.
- This method of data collection can be expensive in terms of manpower.
- Manual counts are typically used for periods of less than a day. Usually conducted on a typical day.
- Used for Classified Traffic Volume Counts Survey and Intersection Turning Movement Survey.

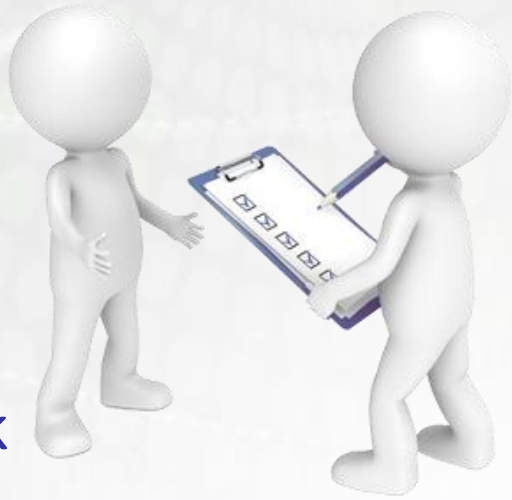
AUTOMATIC TRAFFIC COUNTS

- The automatic count method provides a means for gathering large amounts of traffic data.
- Automatic counts are usually done over several days and may extend to weeks, months, or even a year.
- The most commonly used detector types are:
  - ✓ Pneumatic tubes
  - ✓ Inductive loops
  - ✓ Magnetic Sensor
  - ✓ Micro-millimetre wave Radar or Laser detectors
  - ✓ Video Camera



ORIGIN-DESTINATION SURVEY

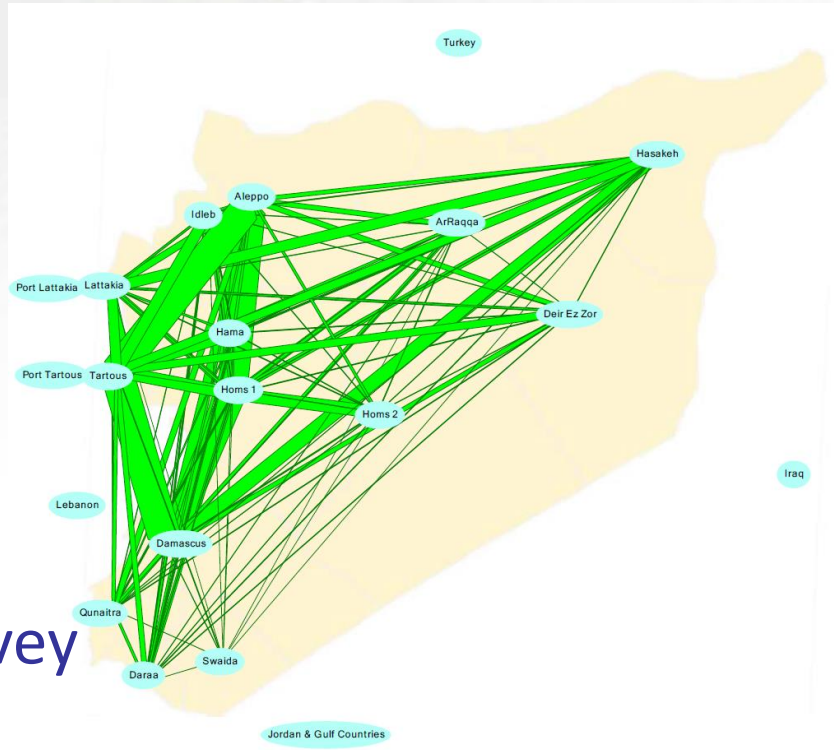
- The Origin/Destination (O/D) survey provides key information for road traffic modeling as well as transport and mobility planning.



- It is widely used in the field of road network analysis, traffic management & planning studies, and impact assessment.
- O/D surveys are conducted in order to obtain useful data to build and calibrate demand patterns and volumes (attraction and generation).

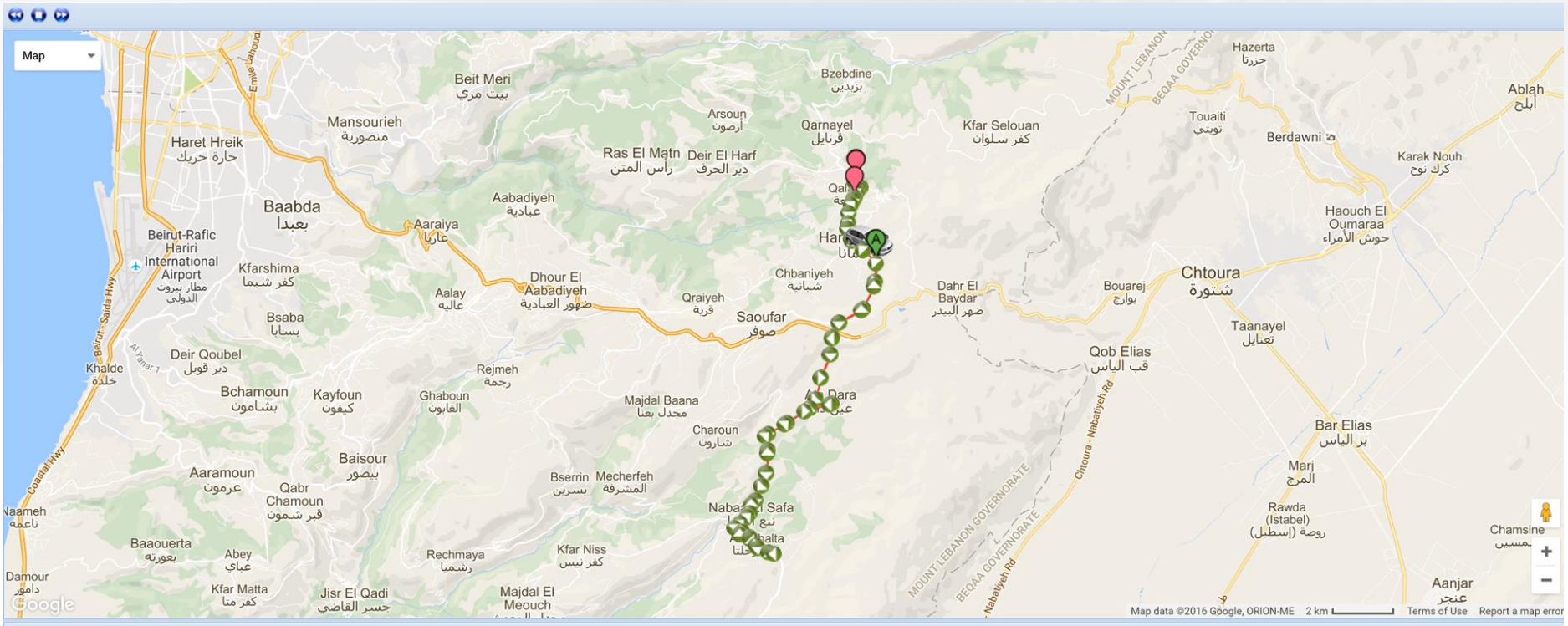
ORIGIN-DESTINATION SURVEY

- The main purpose of the O/D surveys is to gather information concerning the number of occupants, trip frequencies, trip durations, trip purposes, demand balancing, and socio-professional categories.
- Provide information on:
  - ✓ Route choice
  - ✓ Through traffic
  - ✓ Travel times
  - ✓ Journey purpose
- Roadside interviews or CATI survey



SPEED & DELAY SURVEY

- To assess the speed and delay characteristics along the existing road network: running speeds, overall speeds, fluctuations in speed and delay between two stations of a public transport network.
- To identify bottleneck locations and their probable causes.
- Speed & delay survey is usually carried out by:
  - ✓ “Moving Car Observer Method” by traversing along the road sections, in the peak and off-peak hours.
  - ✓ By photography and video



Speed:13km/h

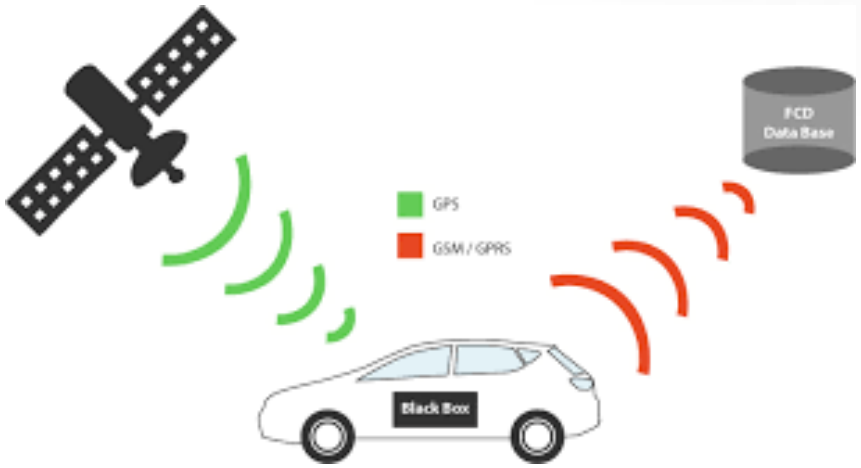
GPS Time:2016-04-22 08:26:48

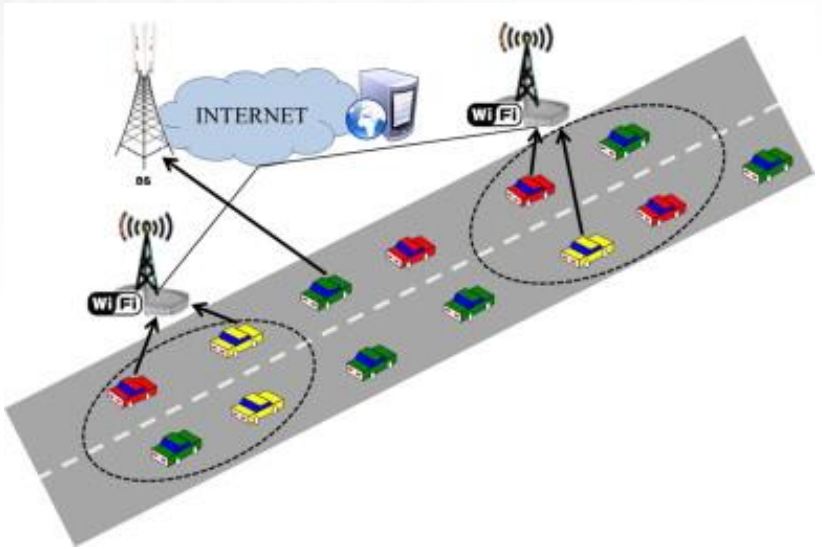
Tracker Battery:4.04443359375

Latitude:33.824425 Longitude:35.735202999999956

FLOATING DATA SYSTEM

- The system is based on collecting data by locating the vehicle, how it is moving, its speed and its destination
- No need for additional equipment
- There are 2 types of surveys
  - ✓ Global Positioning System(GPS)
  - ✓ Mobile Data





ON-STREET & OFF-STREET PARKING SURVEYS

- To assess the parking demand and supply characteristics
- To identify the constraints and suggest appropriate policies for meeting the horizon year parking demand

- To assess the level of usage of on-street and off-street parking facilities
- The survey provides information on utilization of parking spaces by hour of the day, parking turnover rates and the average parking duration.

ON-STREET & OFF-STREET PARKING SURVEYS

- Types of on-street parking surveys are:
  - ✓ Plate number registration
  - ✓ Number of occupied parking spaces
- Types of off-street parking surveys are:
  - ✓ Plate number registration at the entry exit of the parking
  - ✓ Ticketing process
  - ✓ Interview on site (parking)

PEDESTRIAN SURVEY

- To assess the pedestrian flows along and across the intersecting arms at important junctions and sidewalks
- To suggest improvement measures for safe movement of pedestrians
- The possible methods of obtaining the needed Data are:
  - ✓ manual counts
  - ✓ video surveys
  - ✓ Interview surveys

PUBLIC TRANSPORT ON-BOARD SURVEY

- To evaluate the public bus transport user characteristics: origin, destination, mode, trip length and travel cost
- Public transport companies are in general concerned with the travel patterns, travel behavior, ways to increase ridership
- Field based surveys include boarding and alighting at stations, time and speed.
- While observational surveys measure the system as it currently exists; many times it is necessary to understand the changes in travel behavior due to changes in the operating systems

STATED PREFERENCE SURVEY

- Over the last twenty years, the Stated Preference method has become an important research tool in the field of transportation.
- It allows the use of experimental design to control variables and estimate their respective isolated effect; it also permits the evaluation of measures not yet implemented.
- Evaluating the preference choice of a transport mode is required in order to complete an adequate and reliable modal split and to compute values of time per purpose

HOUSEHOLD SURVEY

- A survey that should be done periodically (following the growth of the country – in general 10 years).
- It is an expensive survey, giving large information that should be treated.
- It allows for contact with the surveyed people in a convenient space, where interviews can be conducted in a context that minimizes misunderstanding of the questions.

ROAD NETWORK CHARACTERISTICS

- Road classification
- Number of lanes
- Speed Limit
- Infrastructure development
- Paving condition
- Traffic safety equipment

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MODELING TOOLS & PARAMETERS ANALYSIS

Eng. Rayane Wehbe

TOOLS TO BE USED

COMPUTERIZED TRAFFIC TOOLS

- To quantify the extent of a transportation problem or to provide an analysis of a proposed transportation solution.
- To increase the number of alternative solutions for engineers, planners or analysts.
- To examine potential solutions that are difficult to consider with manual or analytical methods.
- To try out proposed designs and transportation improvements in the safety at the office without subjecting the public to potential hazards, or investing in costly field trials.
- Productivity is considerably increased in comparison with traditional non-computerized techniques.

WHAT WE ARE AIMING FOR?

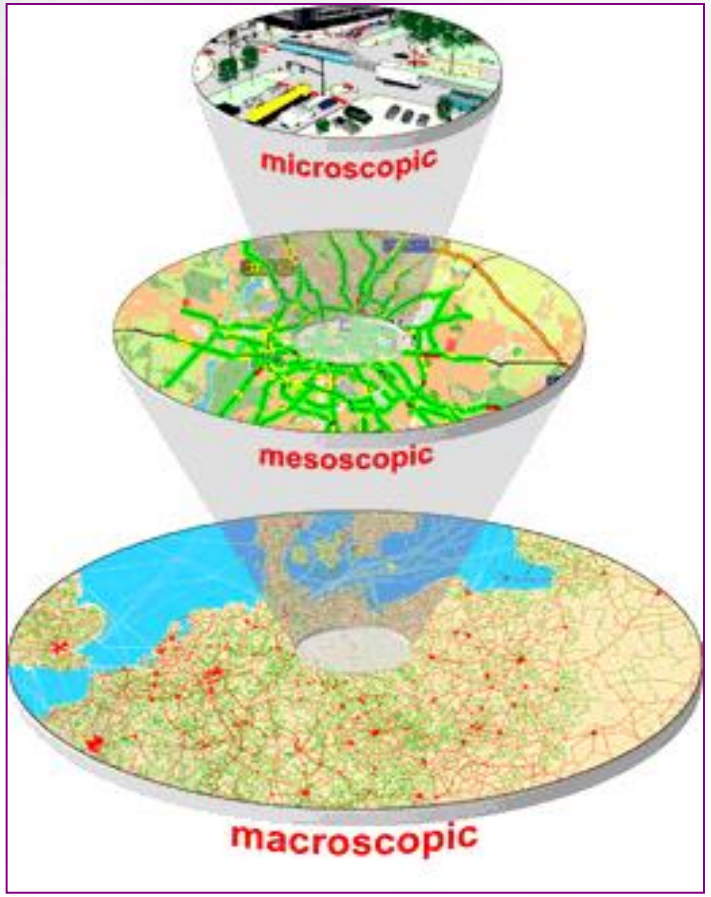
- Rebuild an image of the reality
- A traffic model is a tool allowing to build the mobility system which includes road network, transport modes taken into consideration Demand and Supply configuration and characteristics :

TRAFFIC MODEL LEVELS

The modeling level depend on the project or program size and its influence area as well as the project objectives.

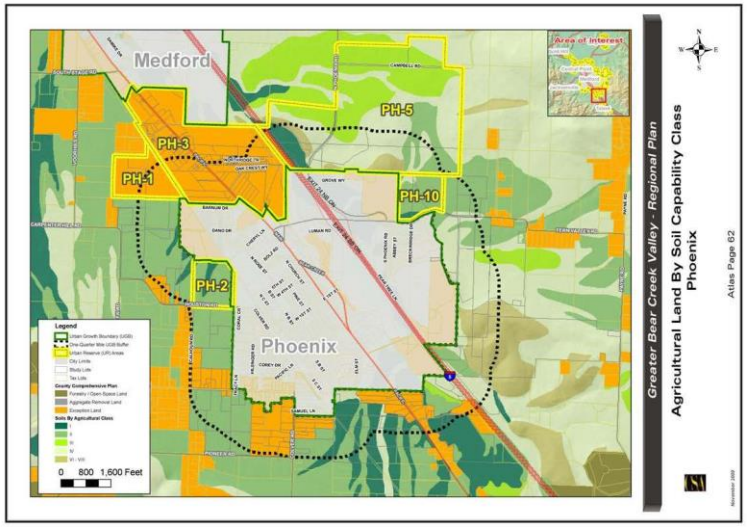
3 Modeling levels:

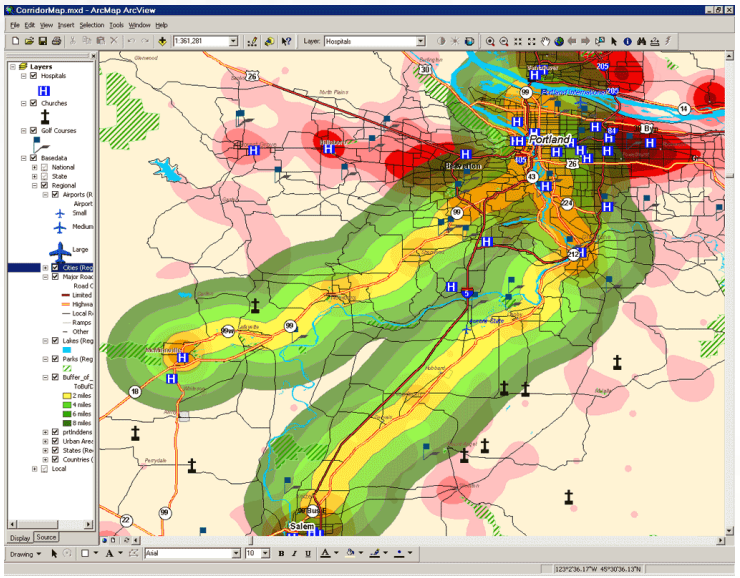
- **Micro-modeling**
  - ✓ Selected intersections
  - ✓ Turning Traffic Movements
  - ✓ Reduced Influenced area
- **Meso-modeling**
- **Macro-modeling**
  - ✓ Large zone
  - ✓ Large network scale (multi-modal)
  - ✓ Generation/Attraction by zone



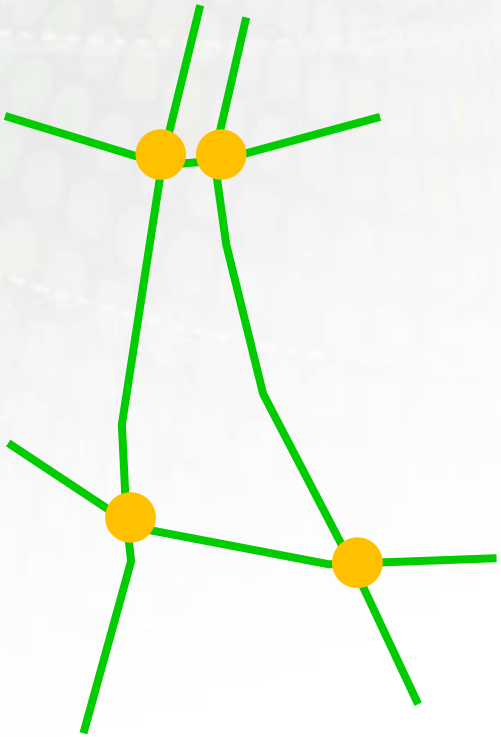
GEOGRAPHIC INFORMATION SYSTEM GIS

- The most common software to collect data
- Files can be read by other planning and modeling software
- It can help in planning, monitoring, and managing strategic infrastructure more effectively
- Various type of schemes, illustrations, mapping, geo-reference, ….





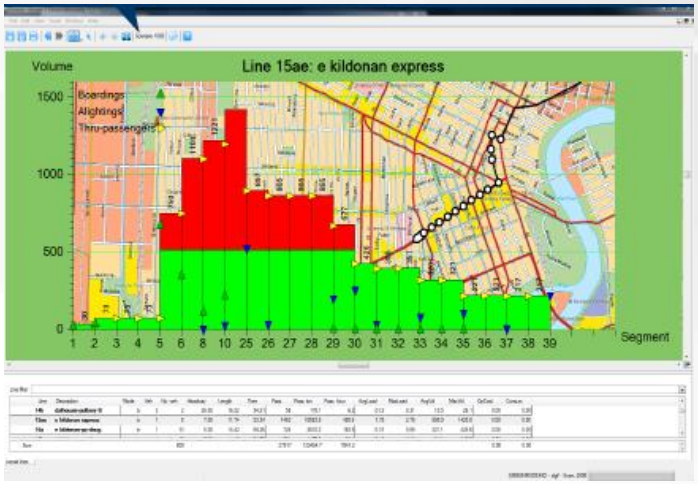
MACRO-MODELLING

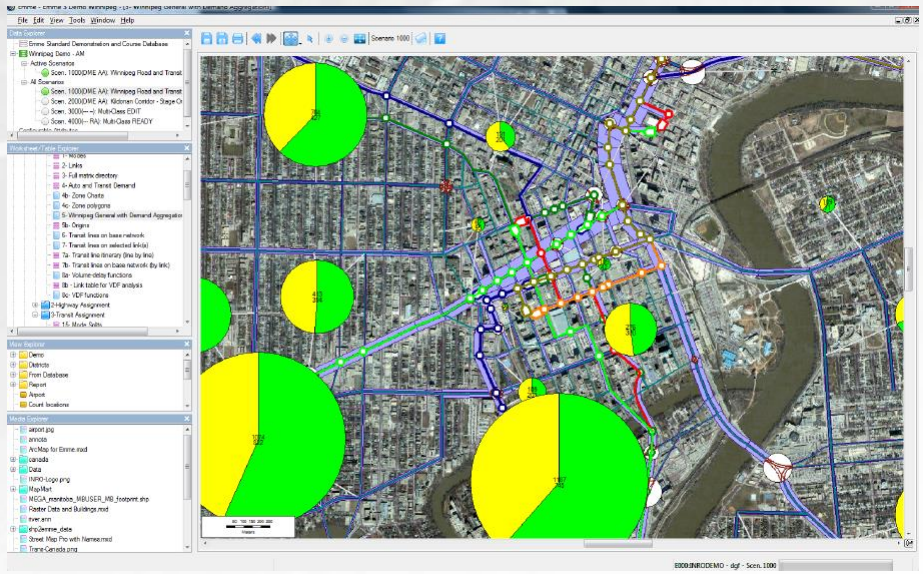


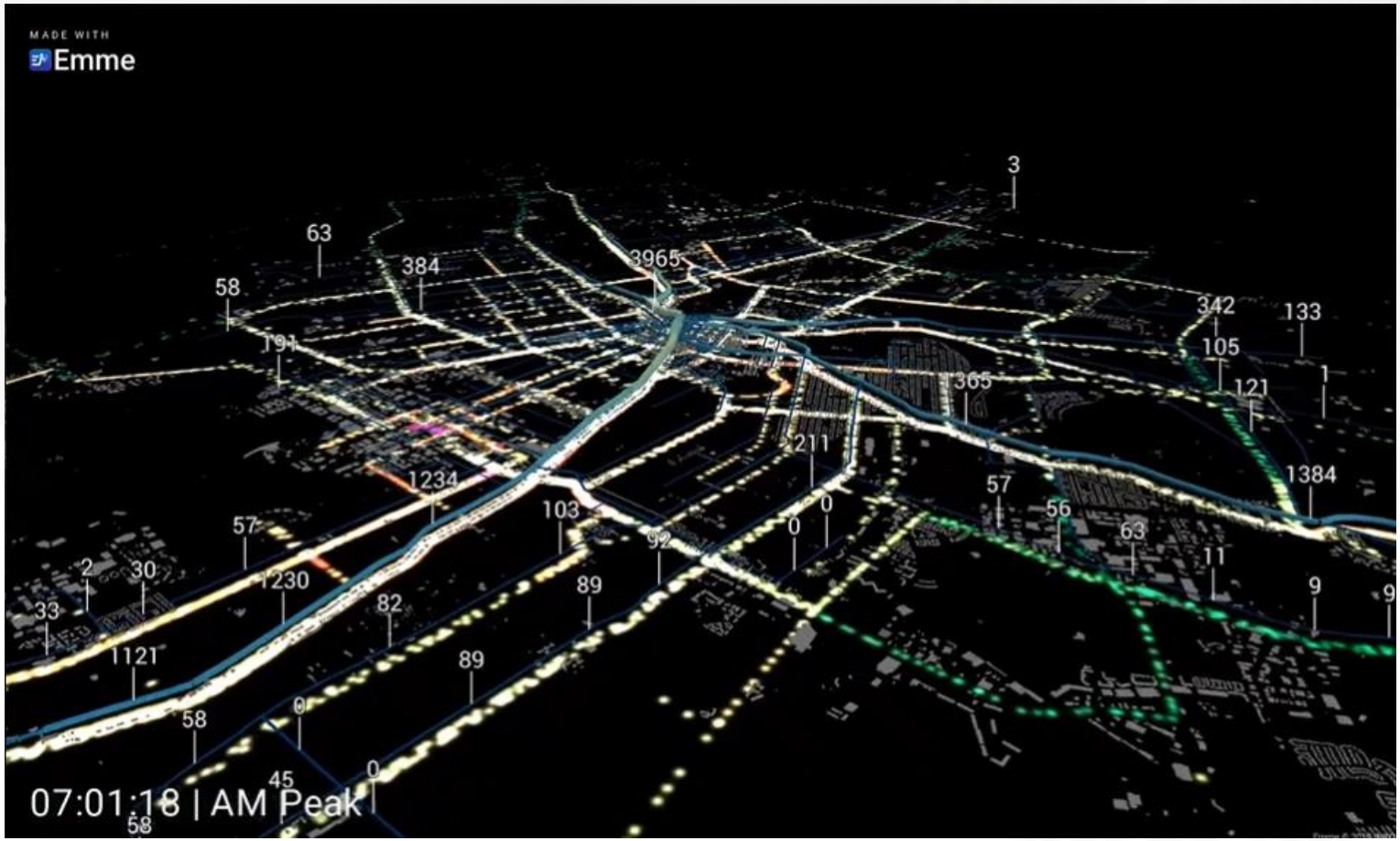
MAIN TRAFFIC MACRO MODELING SOFTWARE

◉ EMME

Montréal University - INRO



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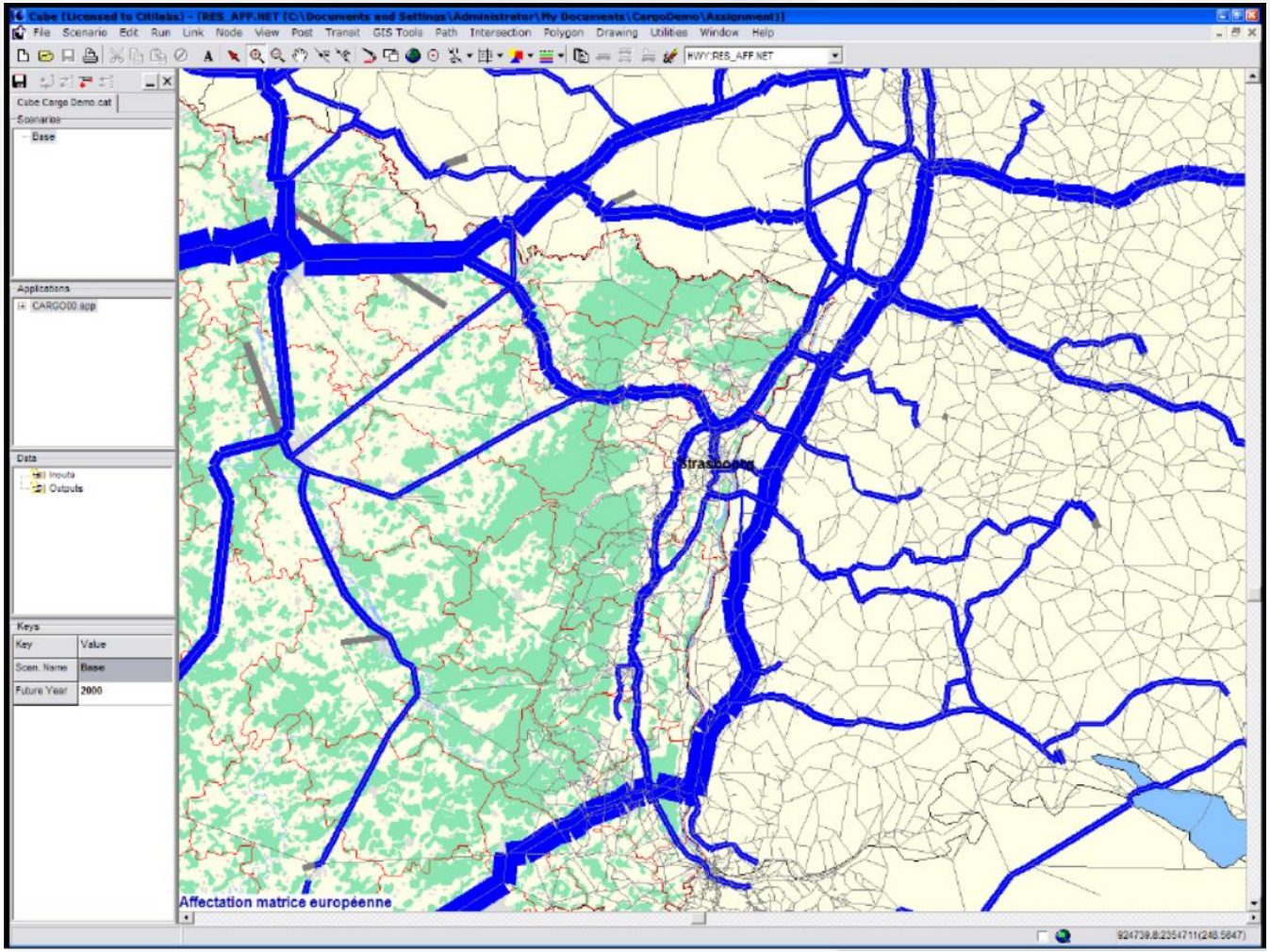
MAIN TRAFFIC MACRO MODELING SOFTWARE

- **CUBE voyager**

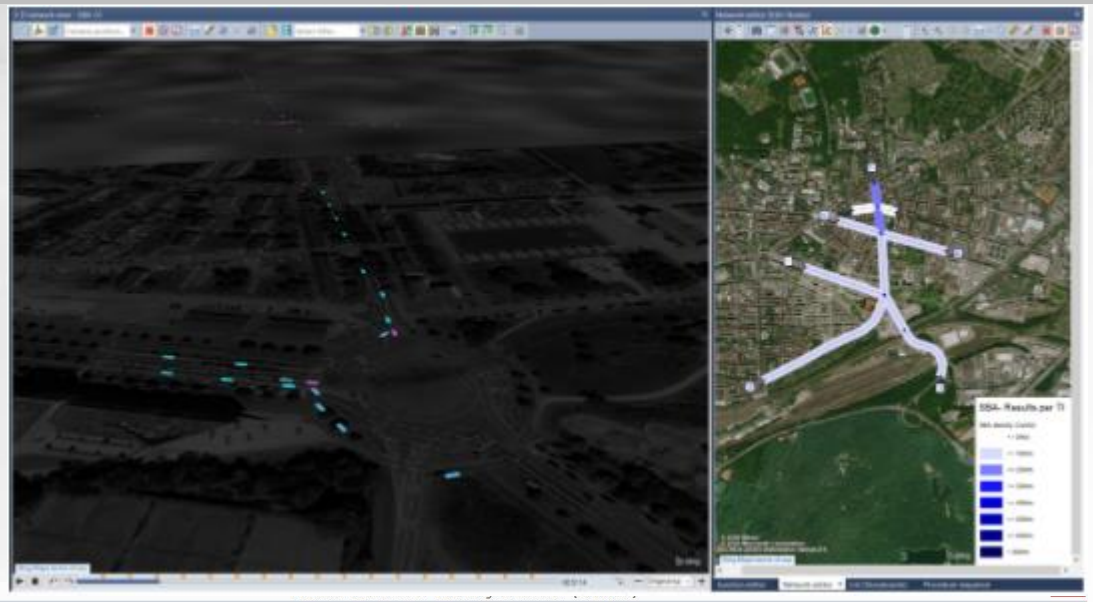
Citilabs - UK

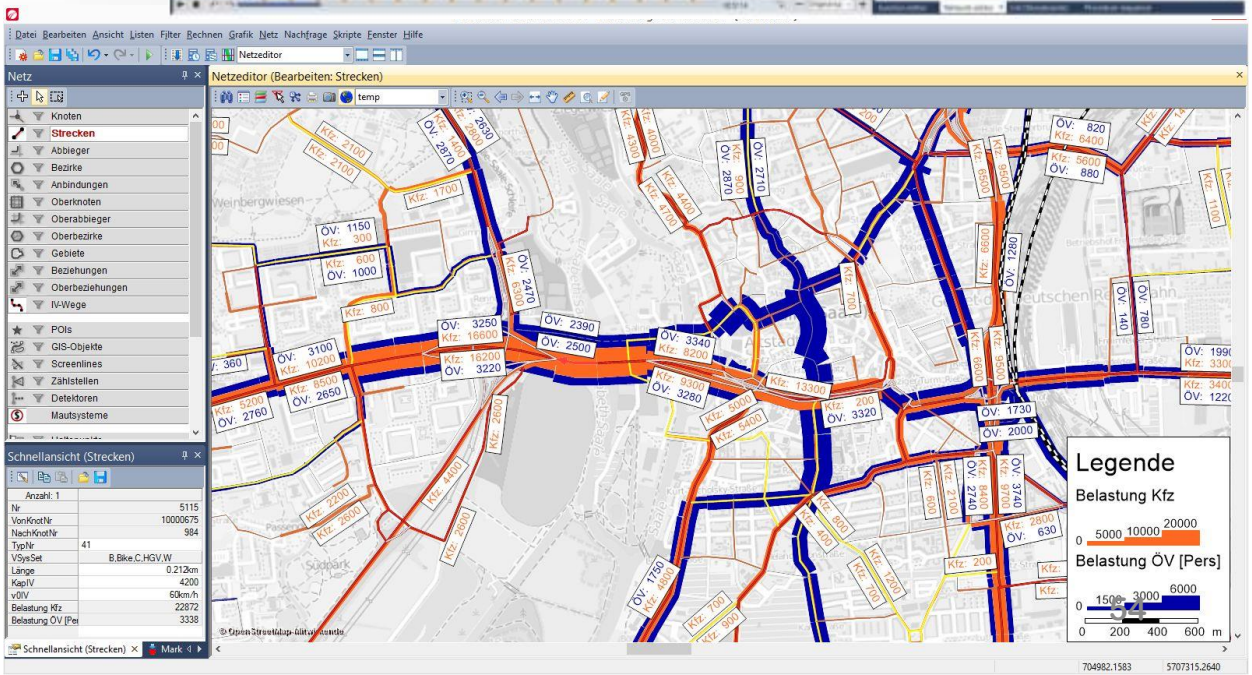


MAIN TRAFFIC MACRO MODELING SOFTWARE

⊙ VISUM

PTV Vision - Germany

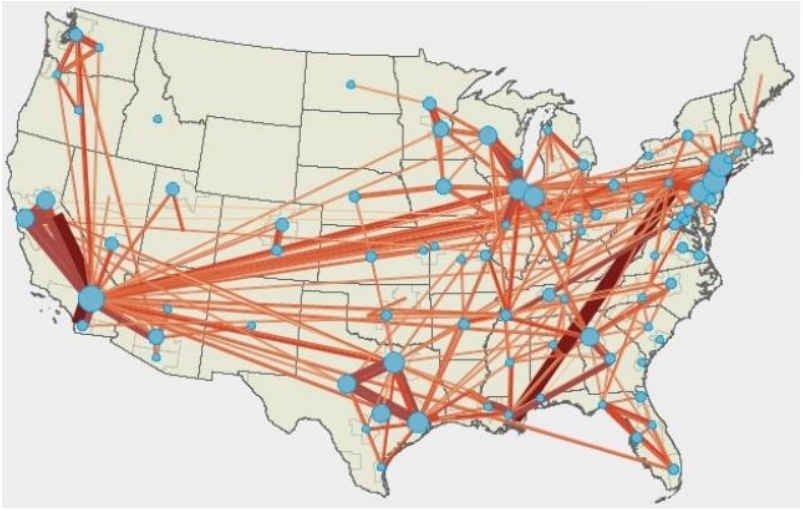


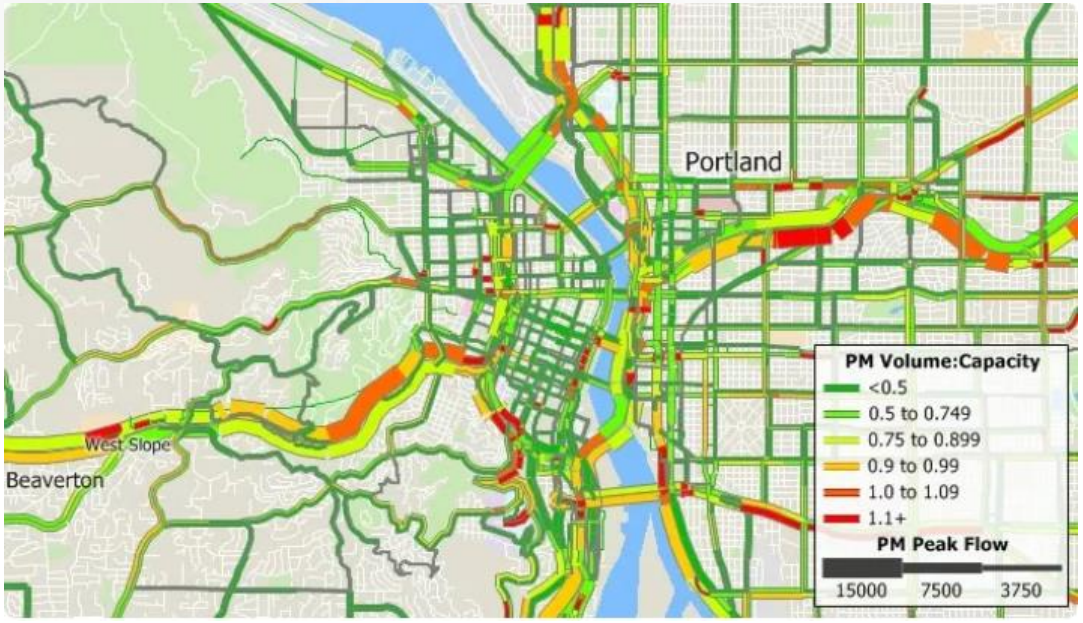


MAIN TRAFFIC MACRO MODELING SOFTWARE

- **TransCAD**

American Software - Caliper

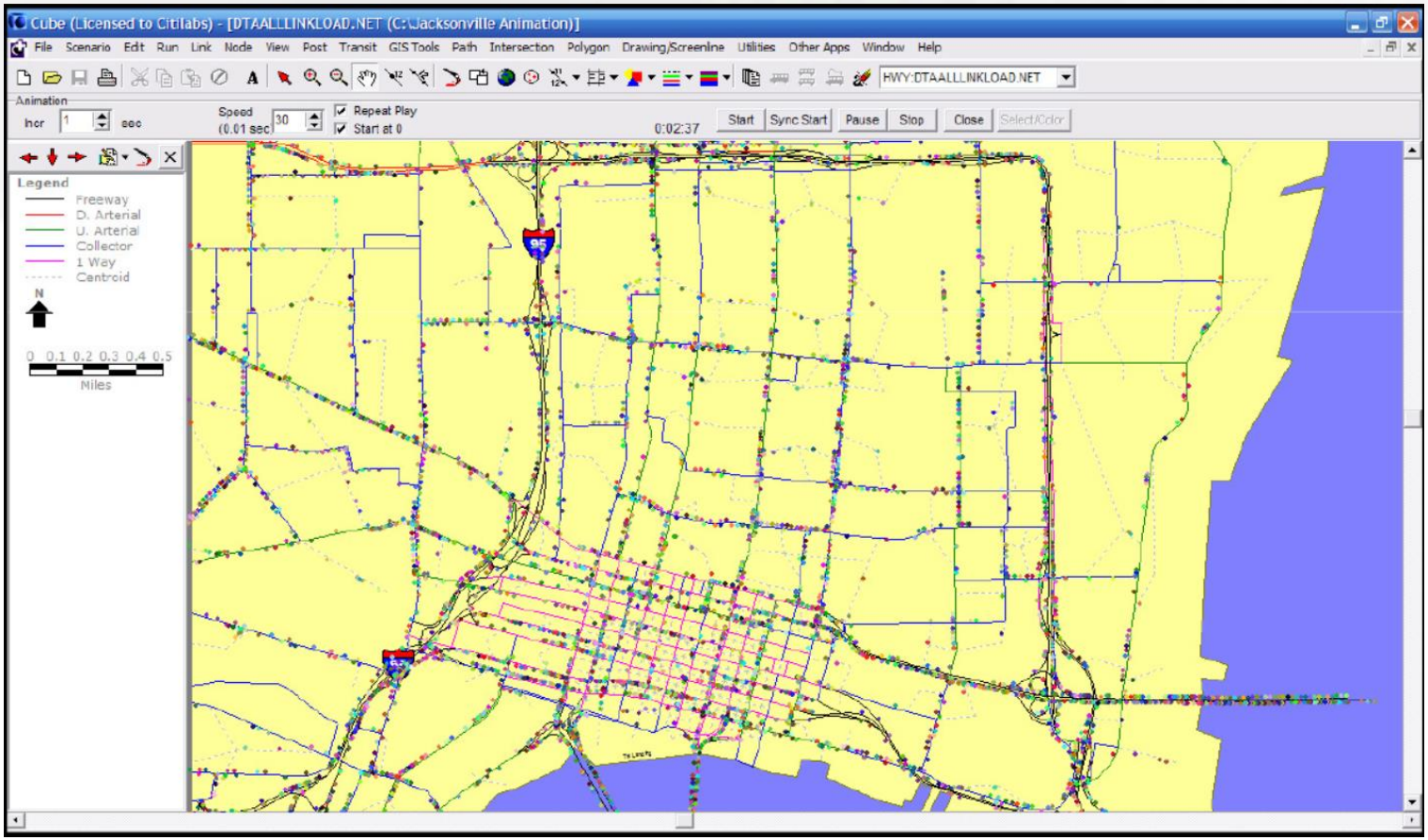




MAIN TRAFFIC MESO MODELING SOFTWARE

- **CUBE Avenue**

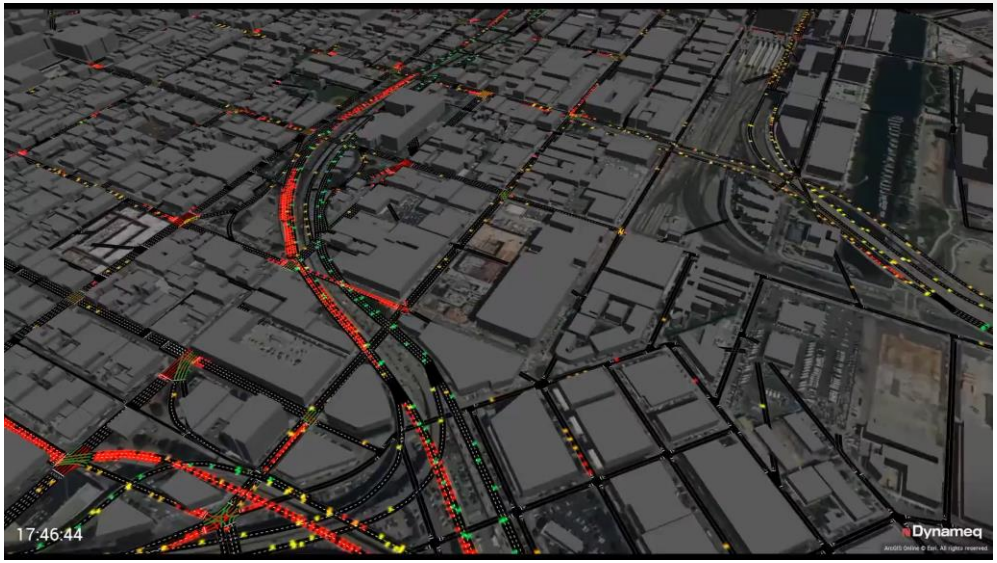
Citilabs - UK

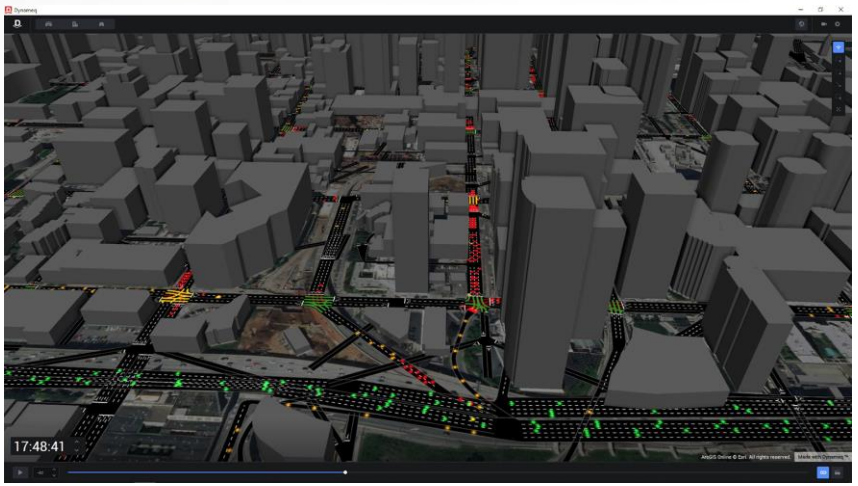


MAIN TRAFFIC MESO/MICRO MODELING SOFTWARE

DYNAMEQ

Multiscale Traffic Simulation





MAIN TRAFFIC MICRO MODELING SOFTWARE

- **CUBE Dynasim**

Citilabs - UK

MAIN TRAFFIC MICRO MODELING SOFTWARE

- **CUBE Dynasim**

Citilabs - UK

MAIN TRAFFIC MICRO MODELING SOFTWARE

- **CUBE Dynasim**

Citilabs - UK

MAIN TRAFFIC MICRO MODELING SOFTWARE

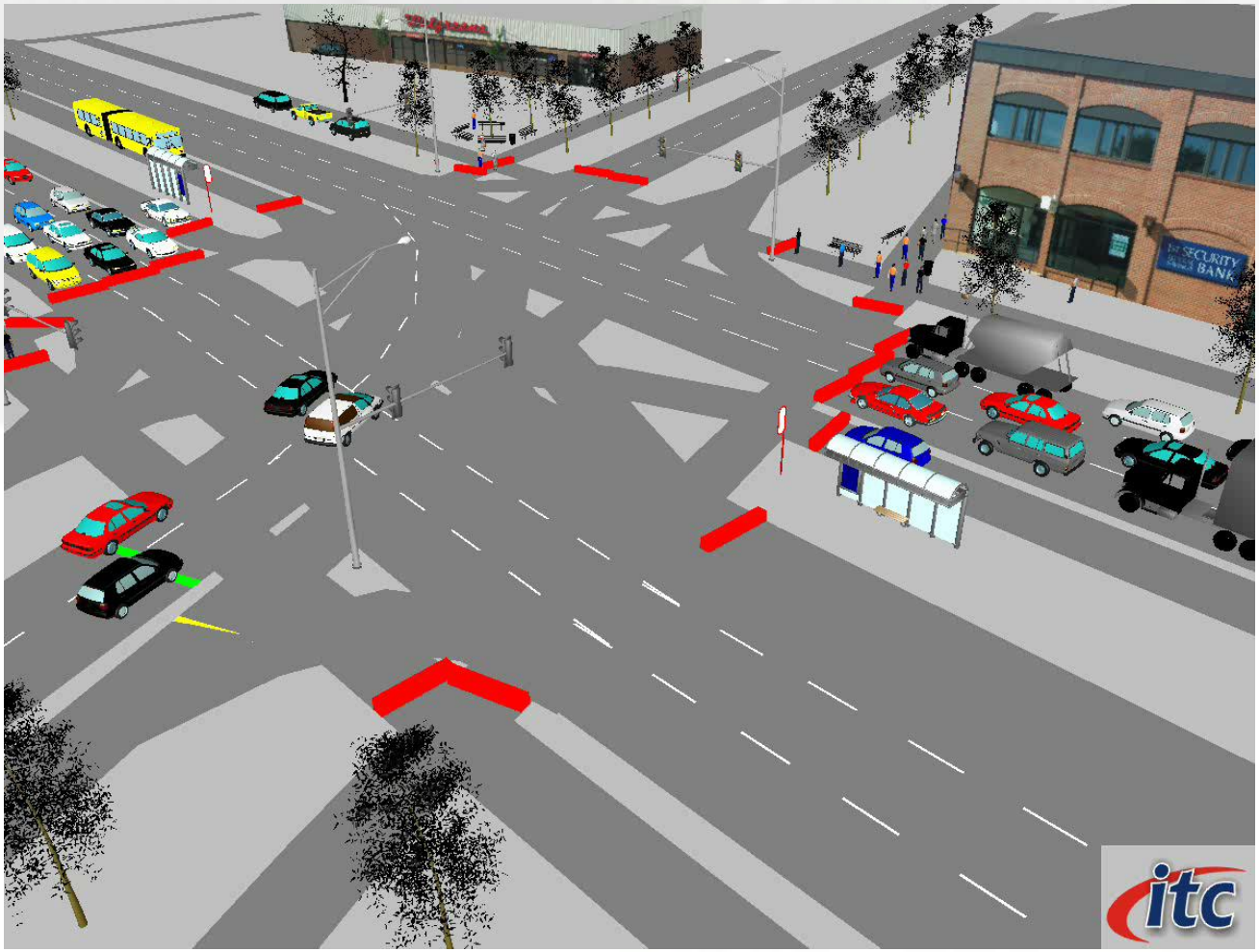
- **AIMSUM**

University polytechnique de Catalogne in Barcelona

MAIN TRAFFIC MICRO MODELING SOFTWARE

- **VISIM**

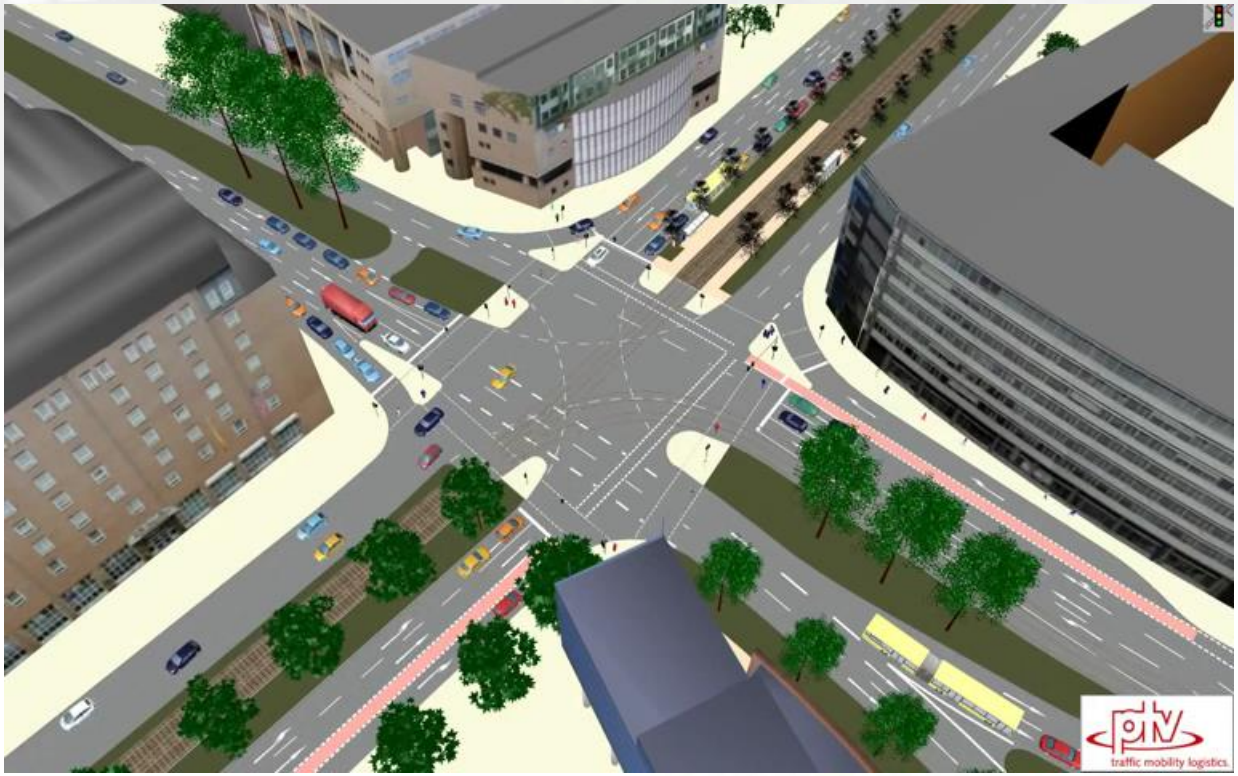
  Karlsruhe University



MAIN TRAFFIC MICRO MODELING SOFTWARE

- **VISIM**

Karlsruhe University



MAIN TRAFFIC MICRO MODELING SOFTWARE

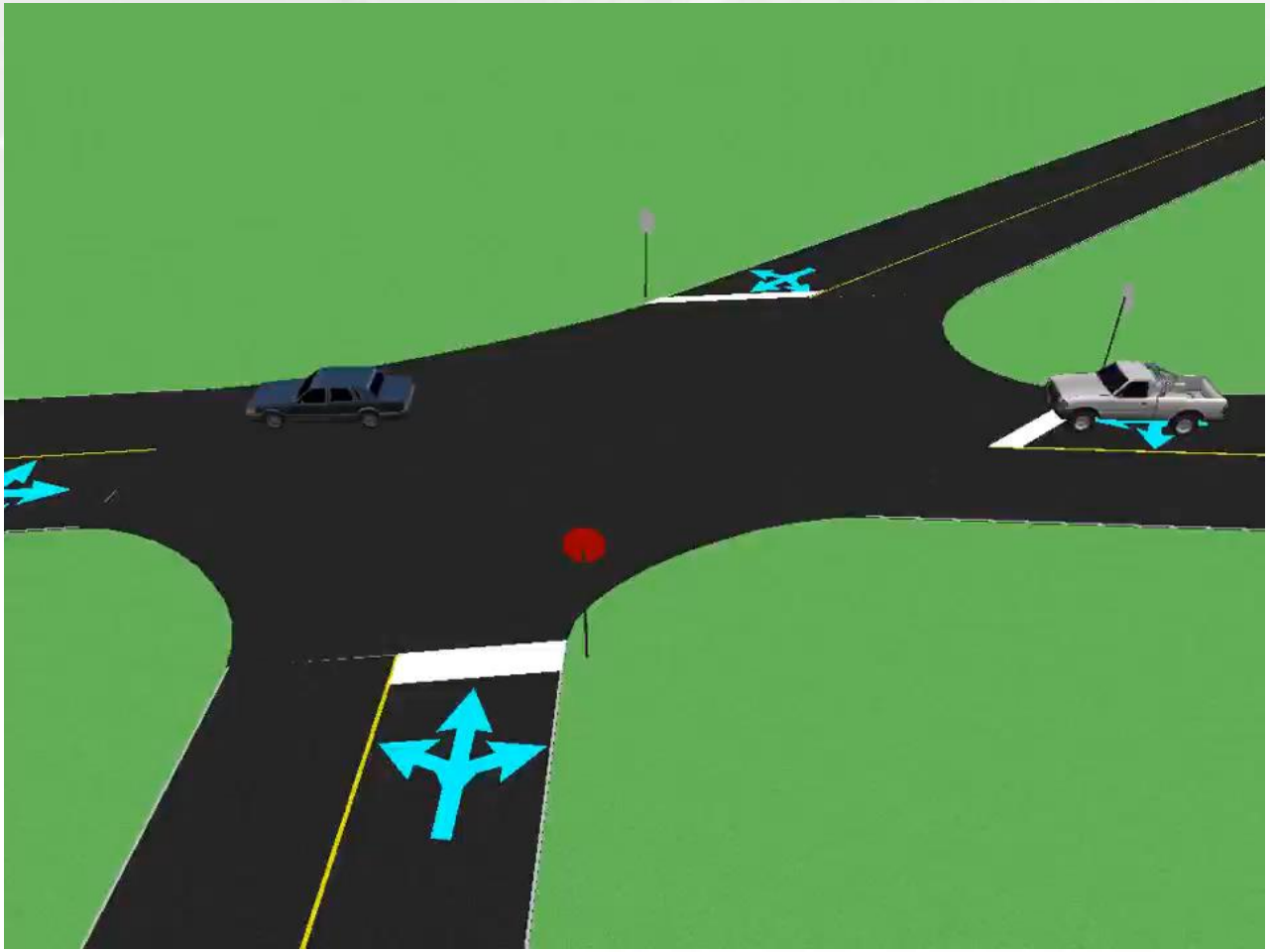
- **SYNCHRO**

American software

MAIN TRAFFIC MICRO MODELING SOFTWARE

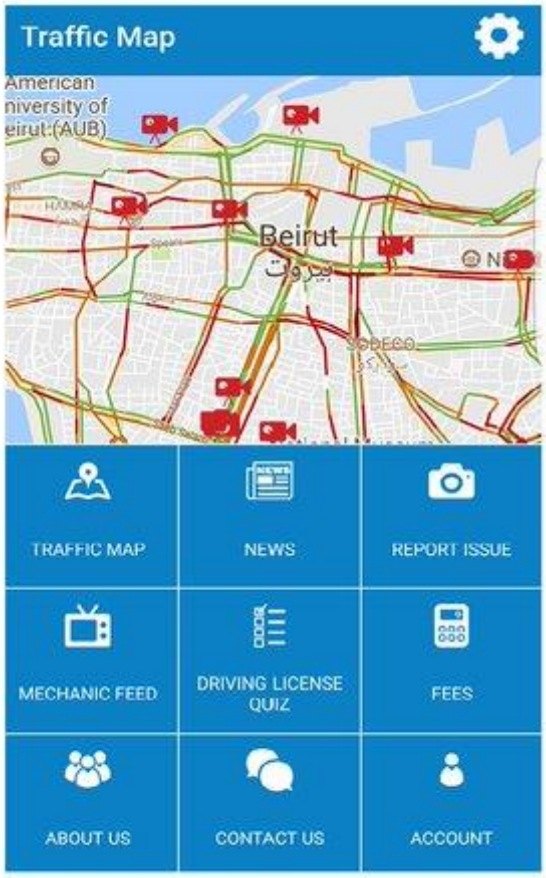
- **SYNCHRO**

American software



MAIN TRAFFIC MICRO MODELING SOFTWARE

- **Other softwares:**
  - ✓ Paramics,
  - ✓ Corsim,
  - ✓ HCS,
  - ✓ …..



MODEL LIMITATIONS

- Results relevancy is related to several factors:
  - ✓ Calibration quality
  - ✓ Taking into consideration local traffic volumes in the demand matrix ⇨ when modeling is not possible
  - ✓ Assignment criteria
  - ✓ Road network characteristics
  - ✓ Adequacy between supply and demand

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ANALYSIS & REPORTING

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ANALYSIS & REPORTING

PARAMETERS TO BE ANALYSED

- Intersection Capacity Utilization ICU & ICU Level Of Service
- Saturation flow on roads
- Land use of the project
- Queuing
- Path analysis
- Road geometry of the accesses
- Safety measurements
- Traffic management control, if any

REPORTING

1. Introduction & Summary
   a) Purpose of report and study objectives
   b) Executive summary
2. Proposed development
   a) Site location
   b) Development phasing & timing (if applicable)
3. Study Area
   a) Area of influence
   b) Site accessibility
   c) Existing land use and approved & anticipated future development

REPORTING

4. Data collection & surveys
   a) Physical characteristics: road characteristics, management control, transit, pedestrian, …
   b) Traffic volumes: Peak hours
5. Assessment of the current situation
   a) Existing Level of service during peak hours
   b) Safety conditions
6. Project Trip Generation
   a) Adopted manual
   b) Trip generation & Trip distribution
   c) Modal choice (if applicable)

REPORTING

7. Assessment of the future situation
   a) Growth factor
   b) Level of service of the roads inside the influence area
   c) Level of service of the intersections surrounding the project
   d) Queue analysis
   e) Traffic control needs, if any
   f) Accessibility to the project
8. Recommendations & Measurements
   a) Road and intersections improvements
   b) Operational improvements
   c) Traffic management
   d) Accesses improvements
   e) Safety

REPORTING

9. Conceptual Design
    a) Proposed projects conceptual design plans
a) Appendices
    a) Traffic counts raw data
    b) Model Calculation sheets

Thank You /   شكراً