TECHNISCHE UNIVERSITÄT WIEN
Vienna | Austria

Institut für Computertechnik
Institute of Computer Technology

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Integrated Networked Streetlighting Infrastructure Simulation with Crossing as Use Case

Alireza Estaji, Marcus Meisel, Thomas Novak, Thilo Sauter


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Marcus Meisel
marcus.meisel@tuwien.ac.at

TU Wien
Institute of Computer Technology
Head of Energy & IT Group

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Intelligent Crossings in the area of tension between energy efficiency and traffic safety

- Partners:
  - Swarco Futurit – traffic signal hardware
  - NAST Consulting – traffic data for simulation
  - Energy Changes Projektentwicklung – tests
  - TU Wien – Institutue of Computer Technology

- Findings
  - based on project INGE (853539)
  - commissioned by Österreischische Forschungsförderungsgesellschaft mbH (FFG)
  - part of Energieforschung e!MISSION Energieforschung 2nd call for proposals

FFG Forschung wirkt.

klima+ energie fonds

Building on previous results

- **SIRUS**
  - Smart Street Lighting System
  - Straightforward
  - Without crossings

Results: prototype implementation + first simulation created

- **SIRUS PLUS**
  - Building SIRUS results
  - Optimization

Results: Physical implementation + Simulation improvements

Intelligent Lighting System for Crossing

- Physical implementation
- Equipment installation
- Application for pedestrians
- Simulation

Main Question

Intelligent Lighting System for **Crossings?**

Ways for improving **energy efficiency** in modern street lighting systems?

Constraints

- Energy efficiency
- Lighting standards
- Safety

Lighting Areas

Input Data

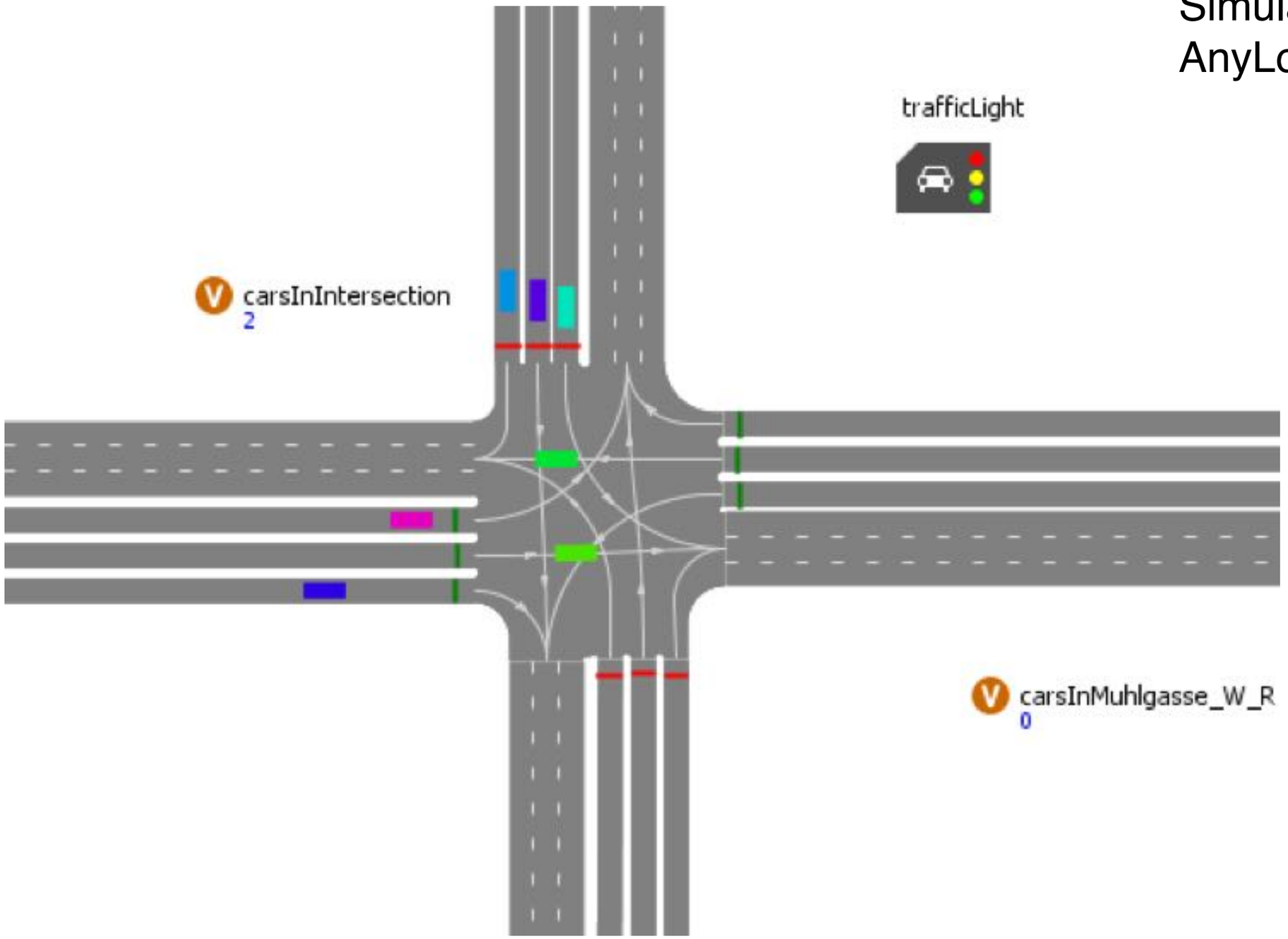
- **Real traffic data**
  - collected by observation
  - sampling
  - video processing

- **Simulated traffic data**
  - provided
  - by partner
  - based on real traffic data

- **Rate of cars**
  - defined in simulation
  - configuration based on simulated traffic data

Simulation Use Case

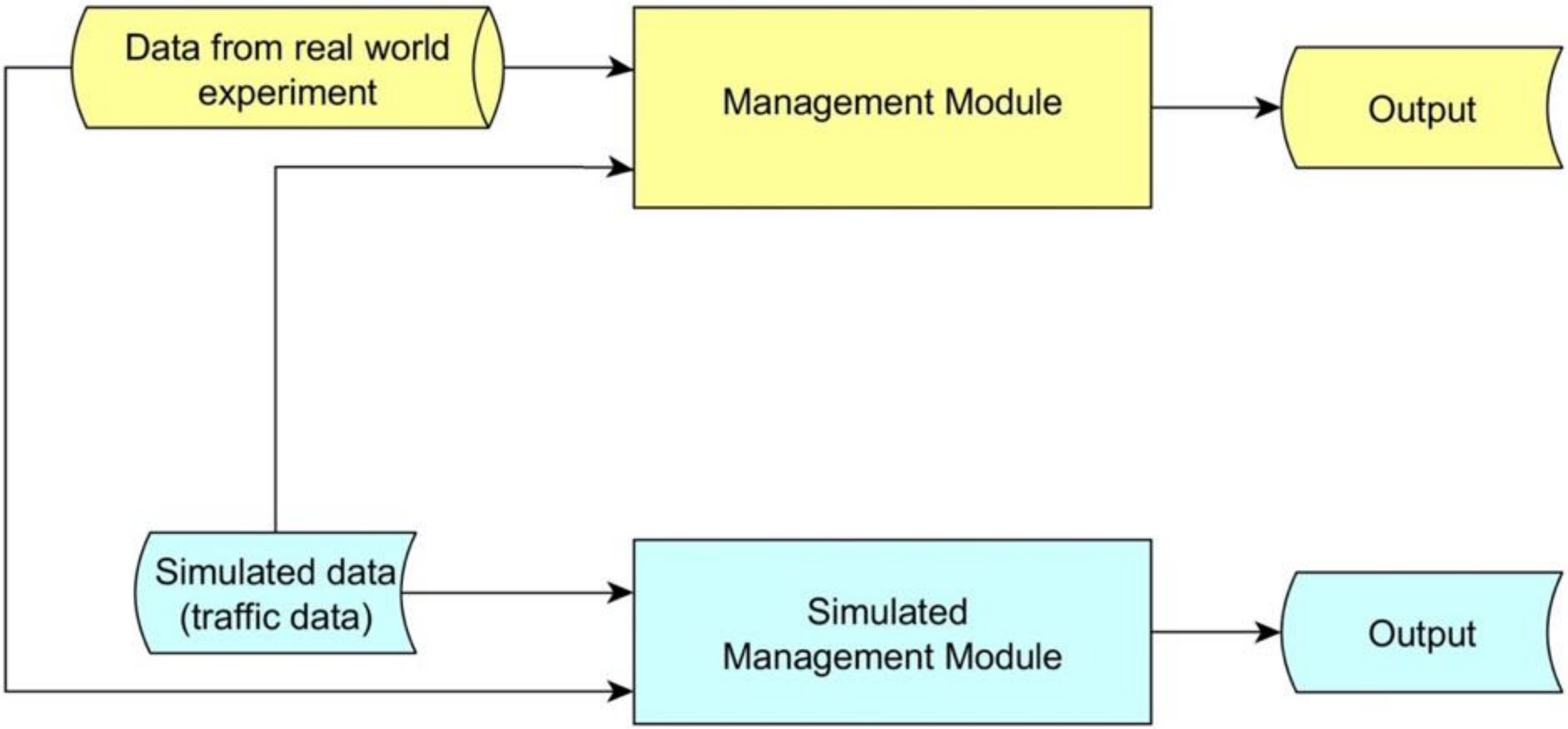
Simulation Environment:
AnyLogic (University 8.1.0)



A sample of the lanes share from traffic

		R12	R11	R10		
		0.017	0.004	0.046		
R1	0.017				0.033	R9
R2	0.386				0.348	R8
R3	0.014				0.017	R7
		0.068	0.017	0.032		
		R4	R5	R6		

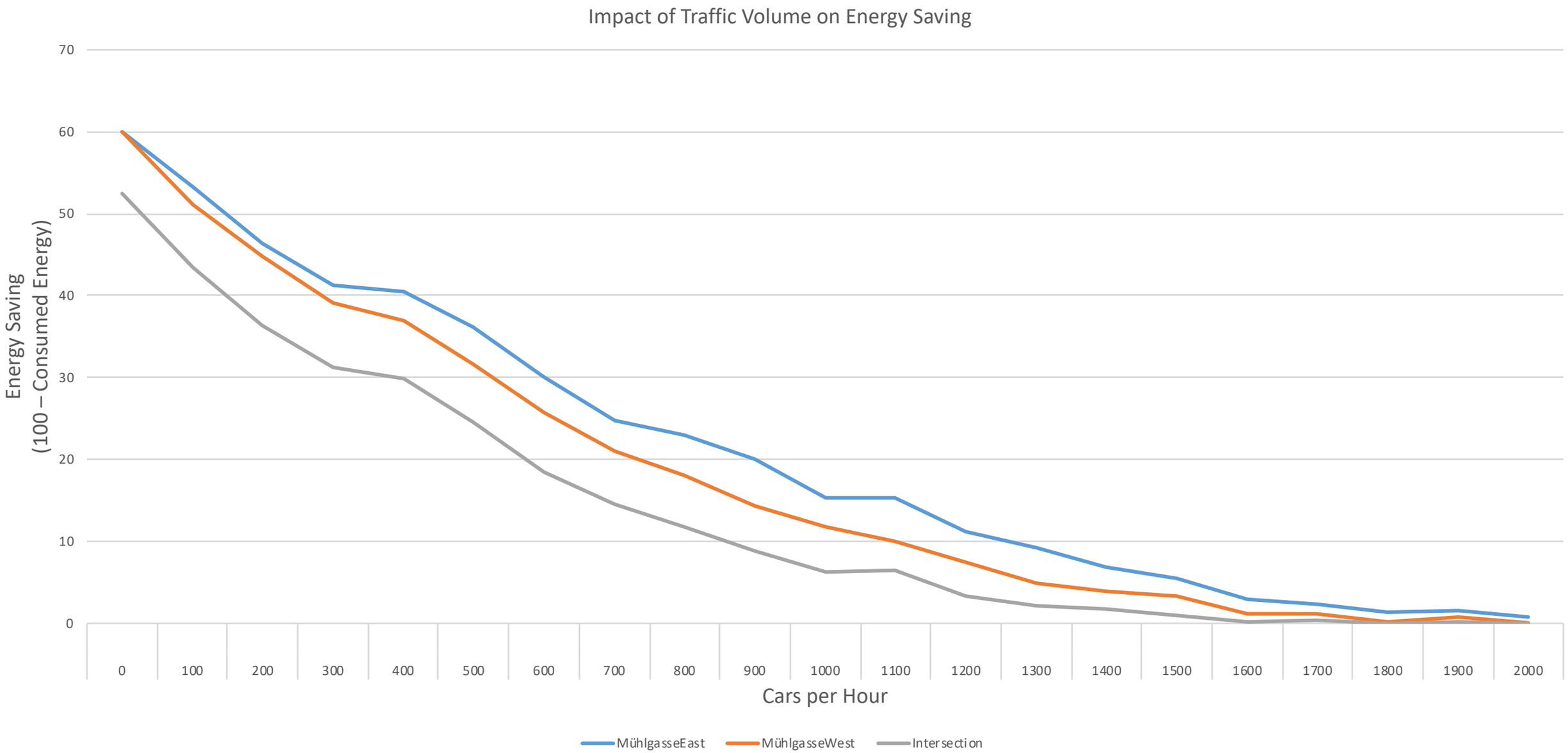
Real System & Simulation



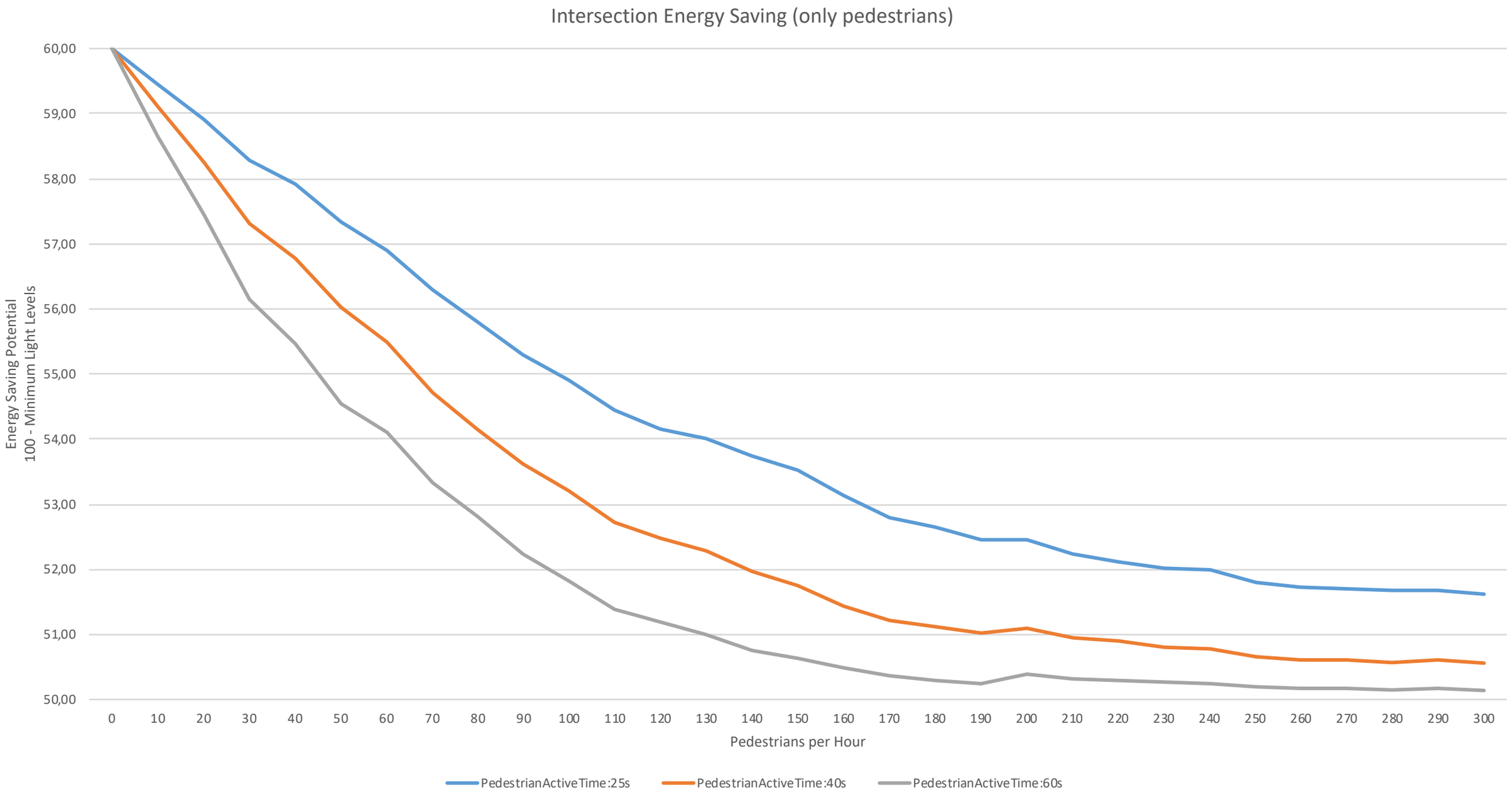
Possible Combinations of Input and Process

Data processor ► ▼Input Type	Management Module	Simulation System
Data from real world experiment	Real world experiment	Process simulation
Simulated data	Input simulation	Process + input simulation

Results, Car rates Variations



Results, Impact of Pedestrian



Outlook

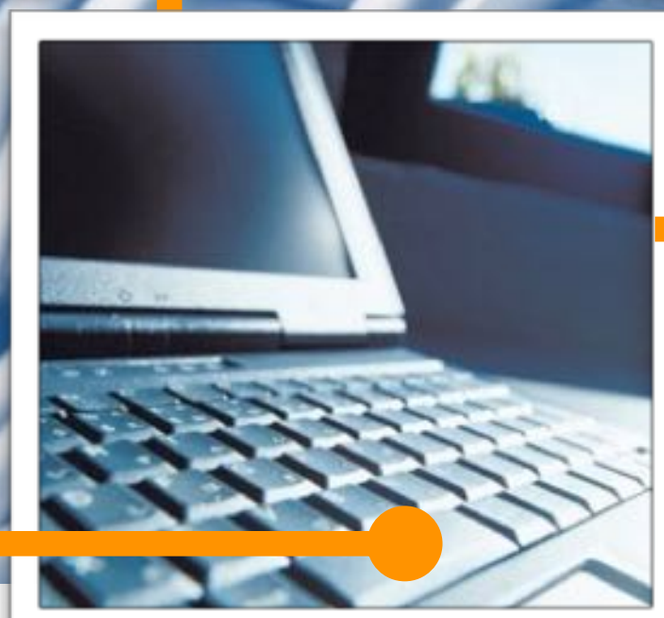
- Look at functionality holistically

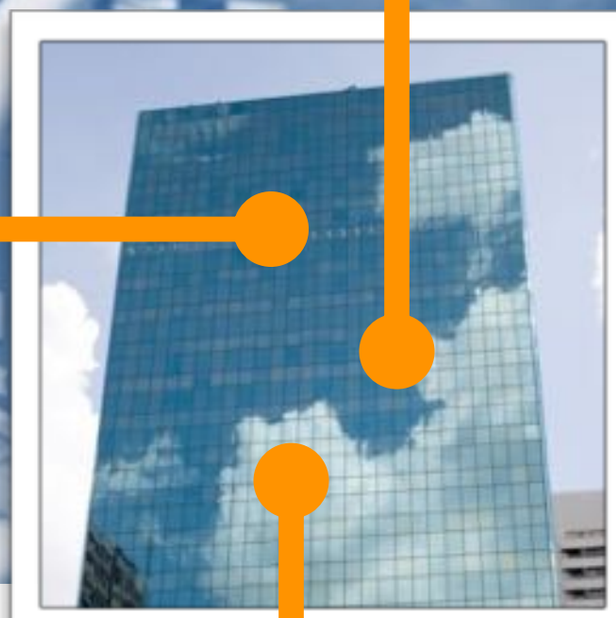
- New algorithms (weather conditions/traffic patterns, react and switch between predefined lighting logics)

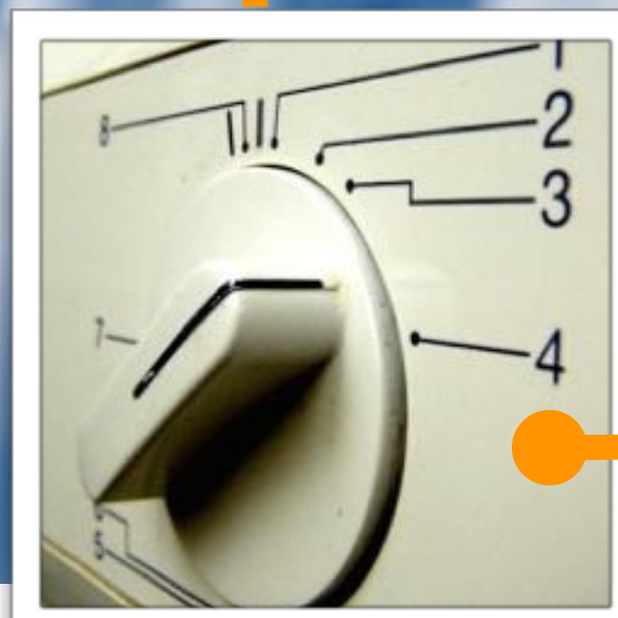
- Remove personnel intensive pre-configuration process (introduce smartness)

- Use synergies of subsystems

Thank you!







DI Marcus Meisel Bakk.techn.
Institute of Computer Technology
Gußhausstrasse 27-29/E384
Vienna, Austria
marcus.meisel@tuwien.ac.at