

SMART STATIONS IN SMART CITIES

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PASSENGER MODELLING: STATUS AND USE FOR RAIL STATIONS DESIGN

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Session 2a: SMART DESIGN

UNDER THE HIGH PATRONAGE OF



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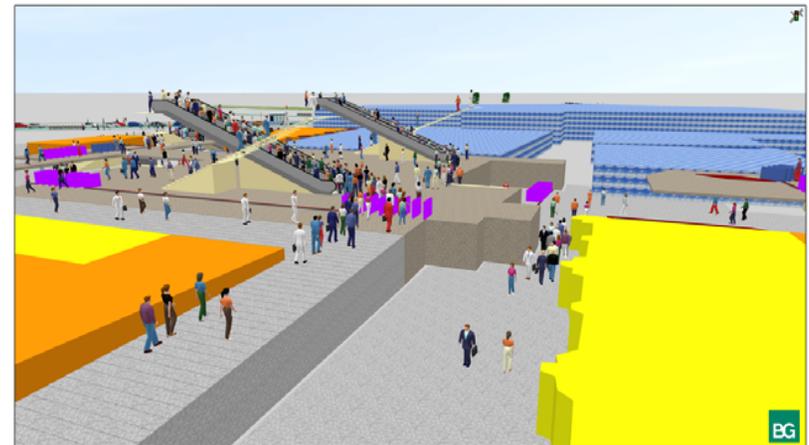
PASSENGER MODELLING: STATUS AND USE FOR RAIL STATIONS DESIGN

1. Introduction: the use of simulation for Rail Stations
3. Example of Austerlitz Rail Station in Paris
5. Research challenges and status
6. Conclusion

INTRODUCTION

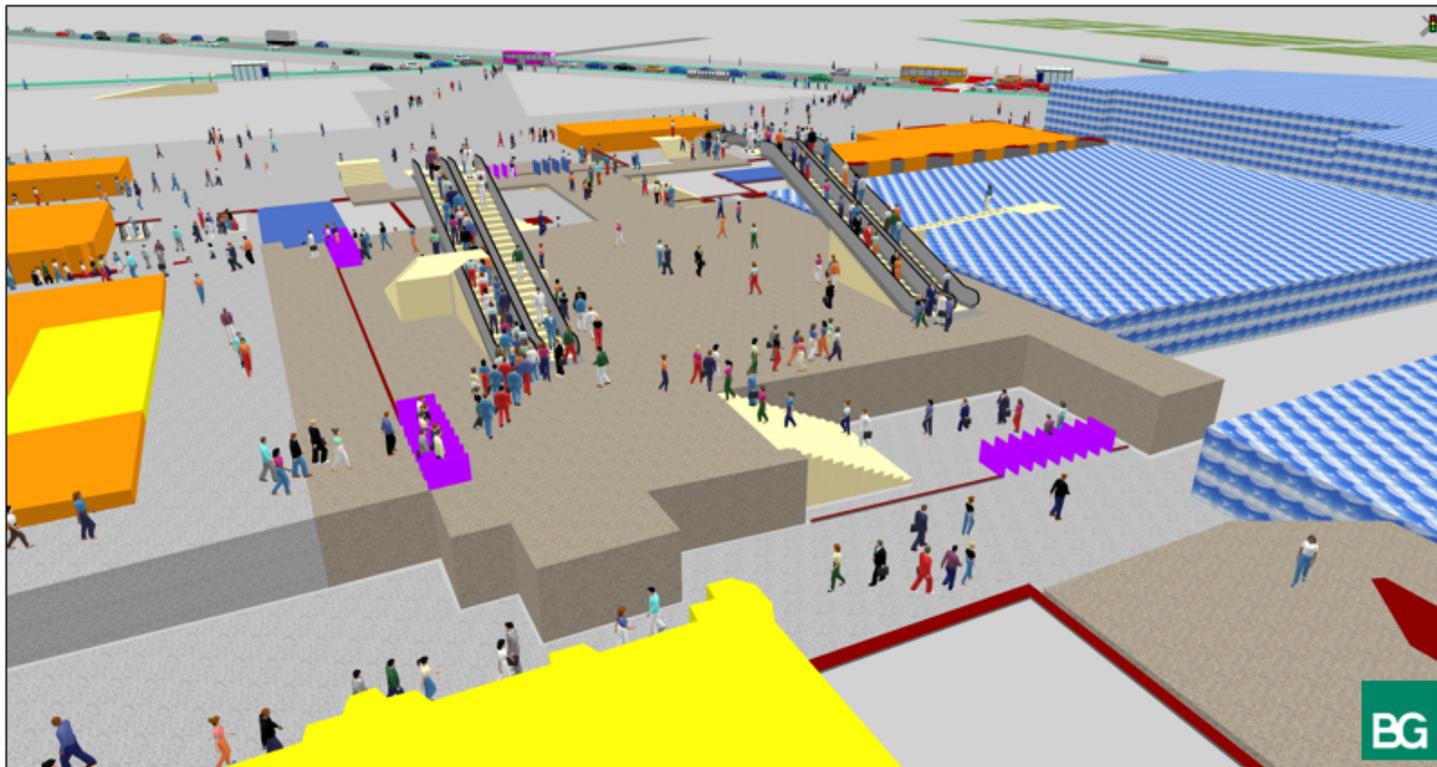
Conception of a rail Station:

- ❖ Functional analysis
- ❖ Design with interactions between:
Urbanists, Architects, Civil Engineers, Transport Engineers.
- ❖ Scenario evaluation:
 - Architectural and constructive aspects
 - Functional aspects: Dynamic modelling of flows to validate the design of scenarios (inside and outside).



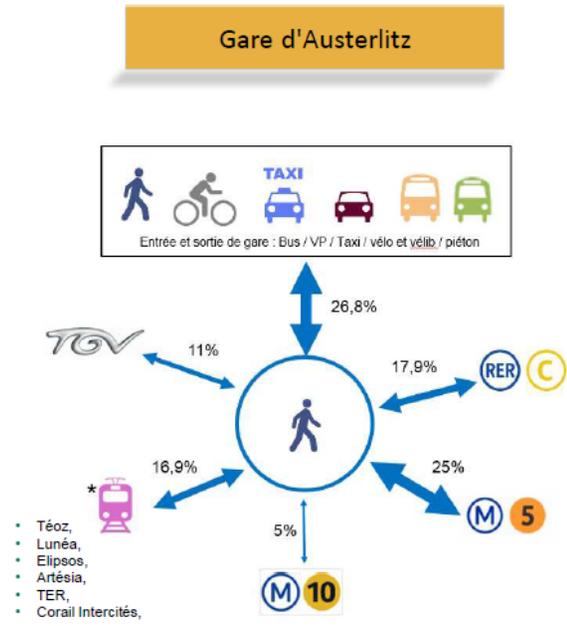
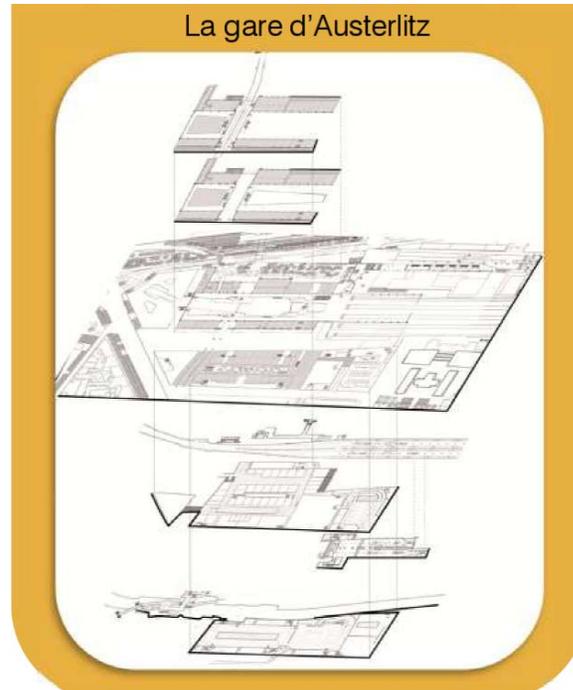
❖ Scope of dynamic simulations

- Inside : Passenger flows
- Outside : Passengers and interactions with car traffic, buses, tram, cyclists and taxis (urban and infrastructure's design)



Example of a Rail Station: Paris Austerlitz

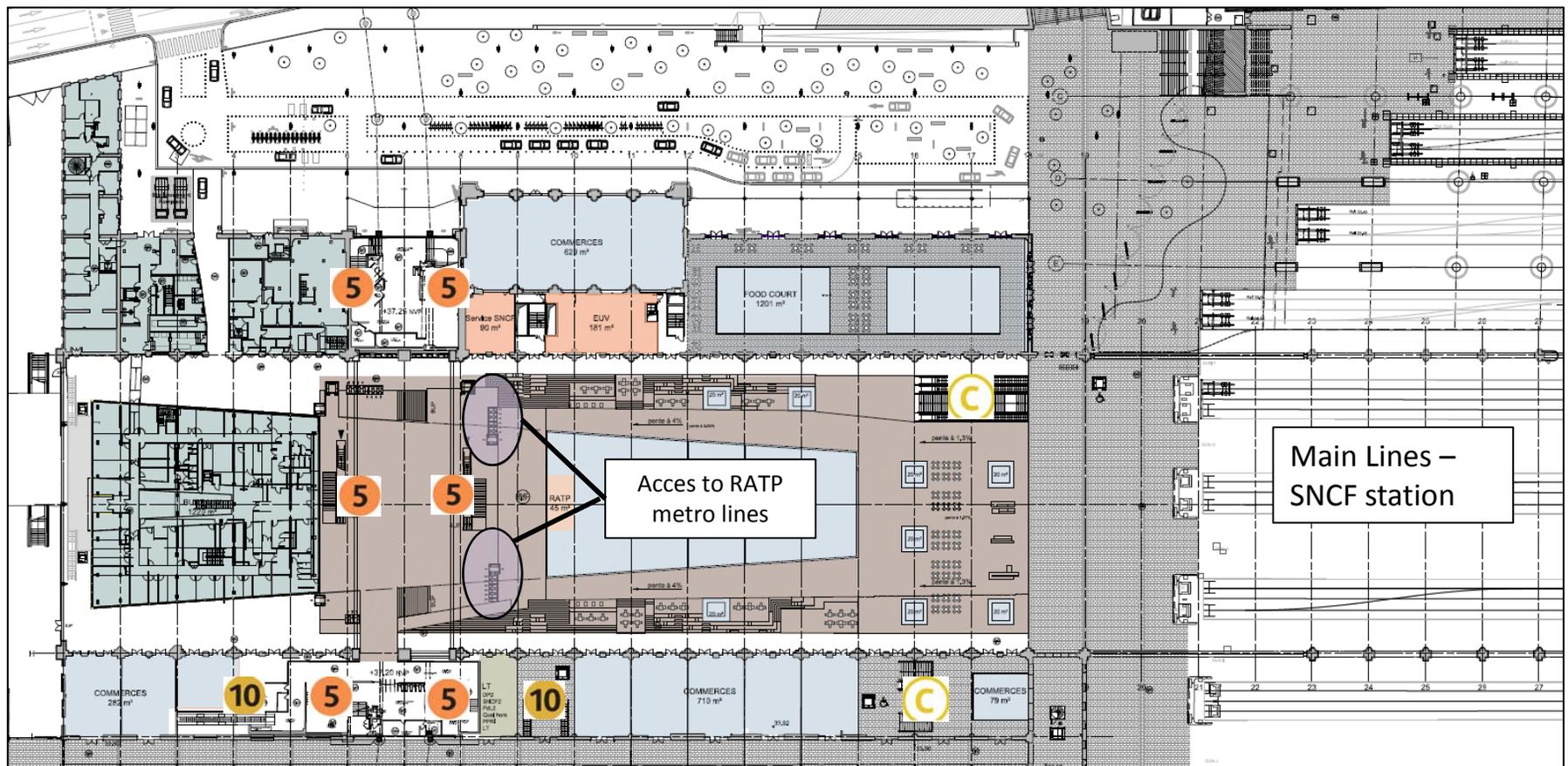
- ❖ 21,3 Mio passengers per year
- ❖ SNCF Surface Station with RER and metro underground stations



Flux prévisionnel 2025 :
 24 000 voyageurs HPM
 (+ 10 000 par rapport à 2008 : +71%)

Validation of Rail Station design

- ❖ Passenger flows at pick hour (in operation and safety)

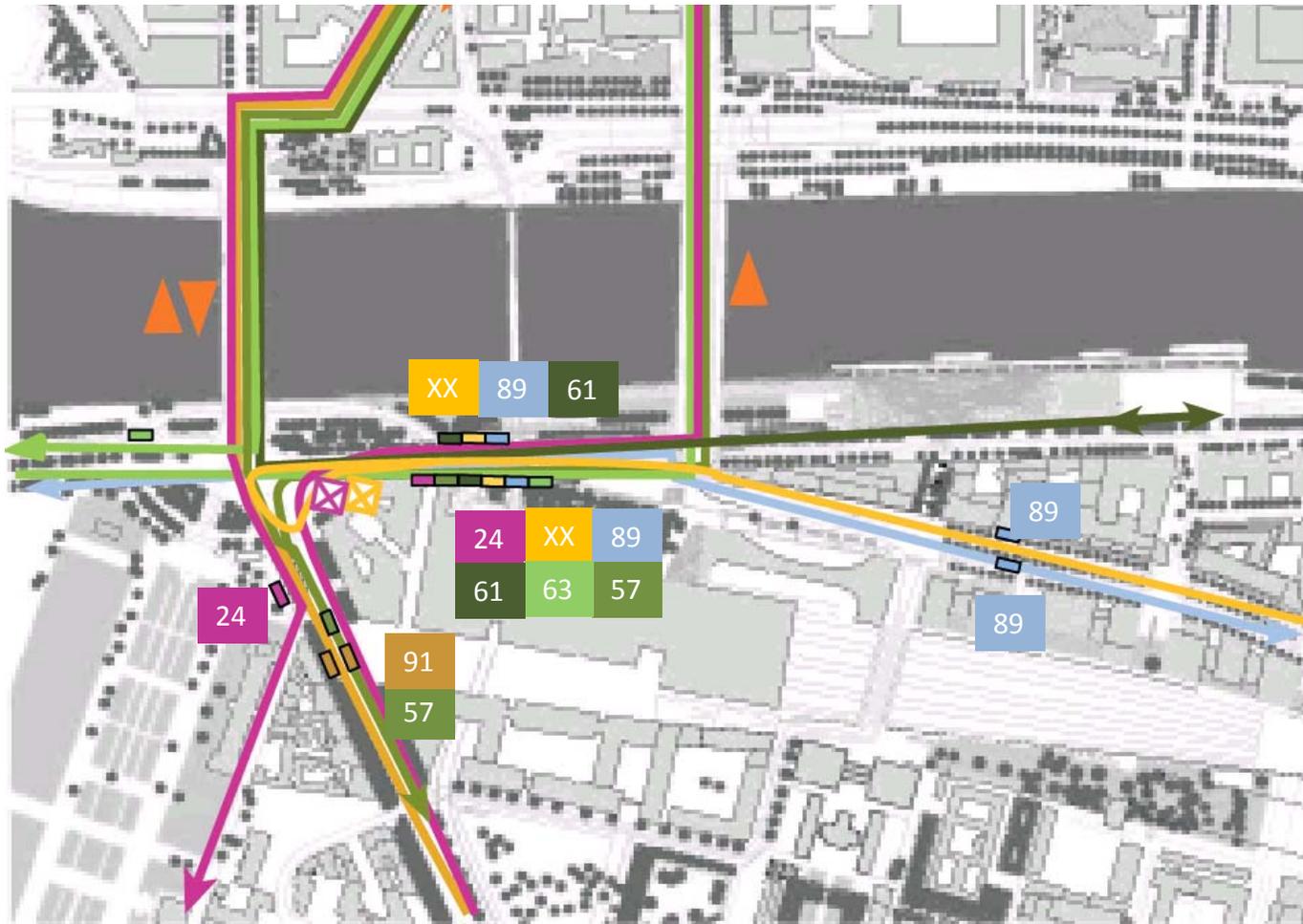


❖ Scenario assessment :

Passenger flows inside Station (23'000 passenger at pick hour H2030)

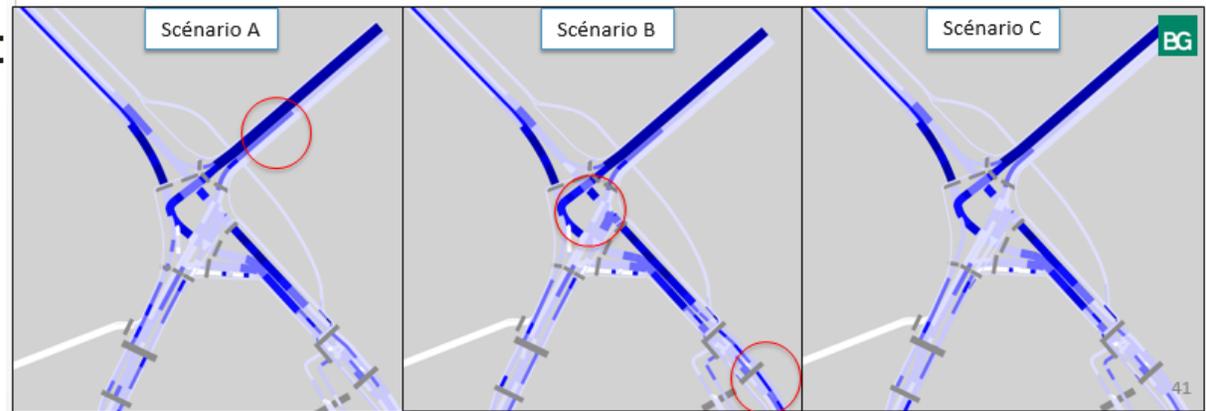


❖ Traffic, public transport and Interactions with traffic



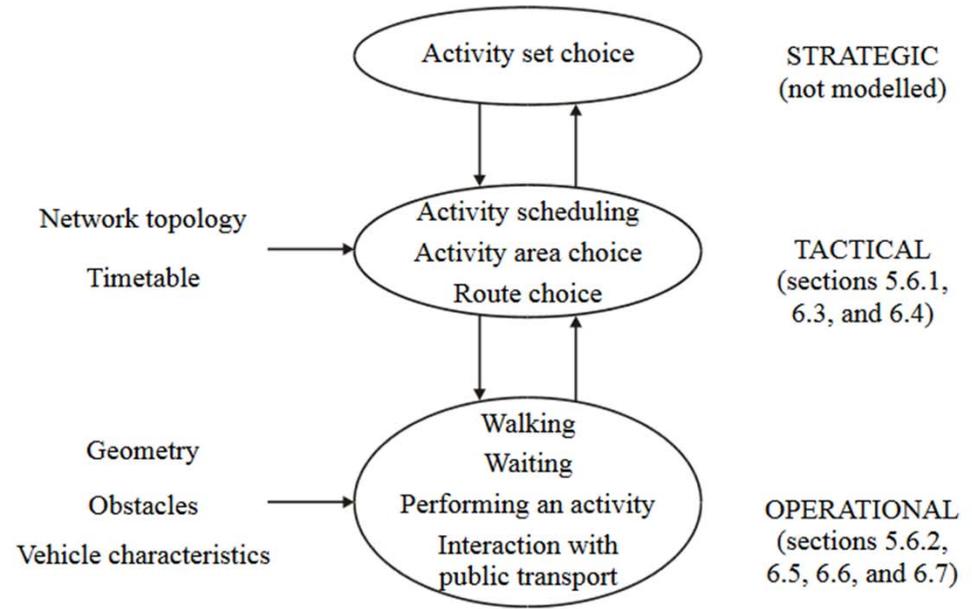
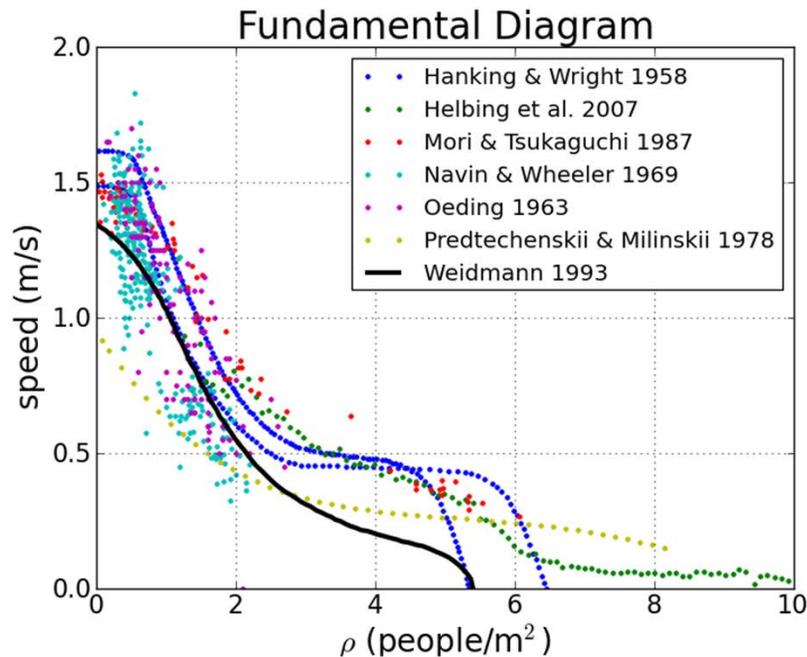
Scenario assessment:

- Traffic density
- Travel times and other statistics



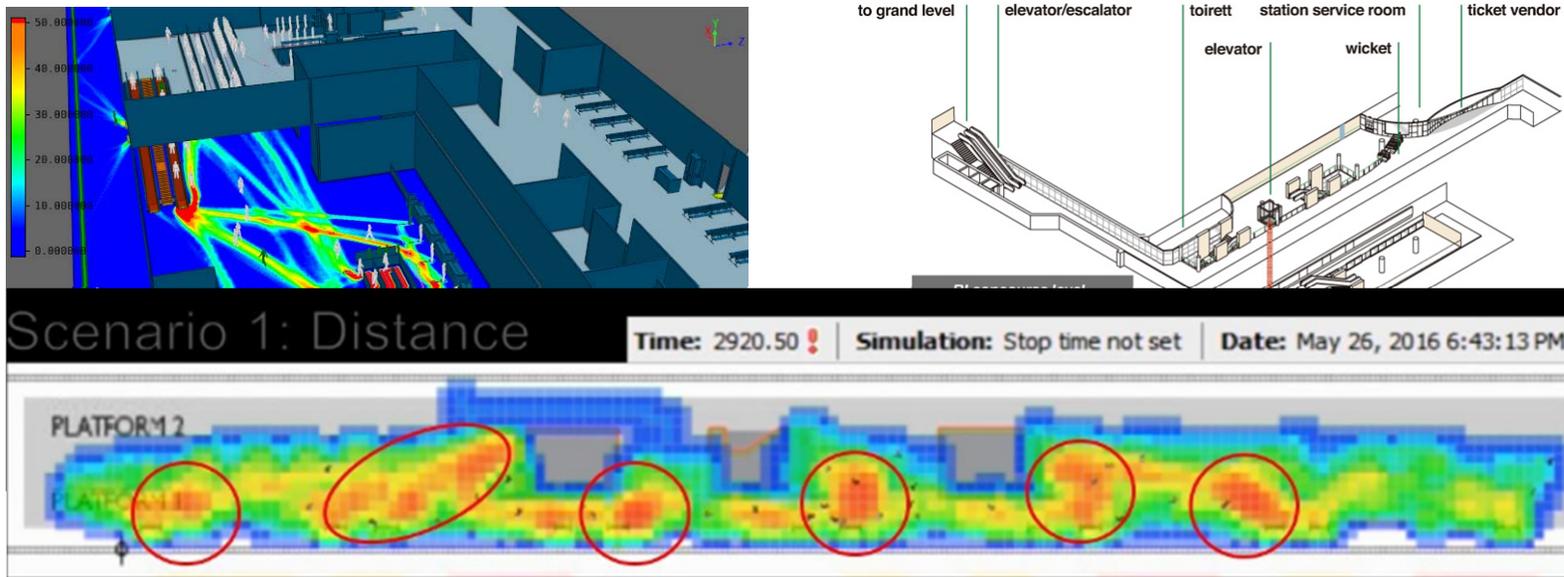
Research Challenges

- ❖ Study pedestrian dynamics
- ❖ Understand pedestrian behavior and interactions
- ❖ Understand how microscopic interactions influence traffic

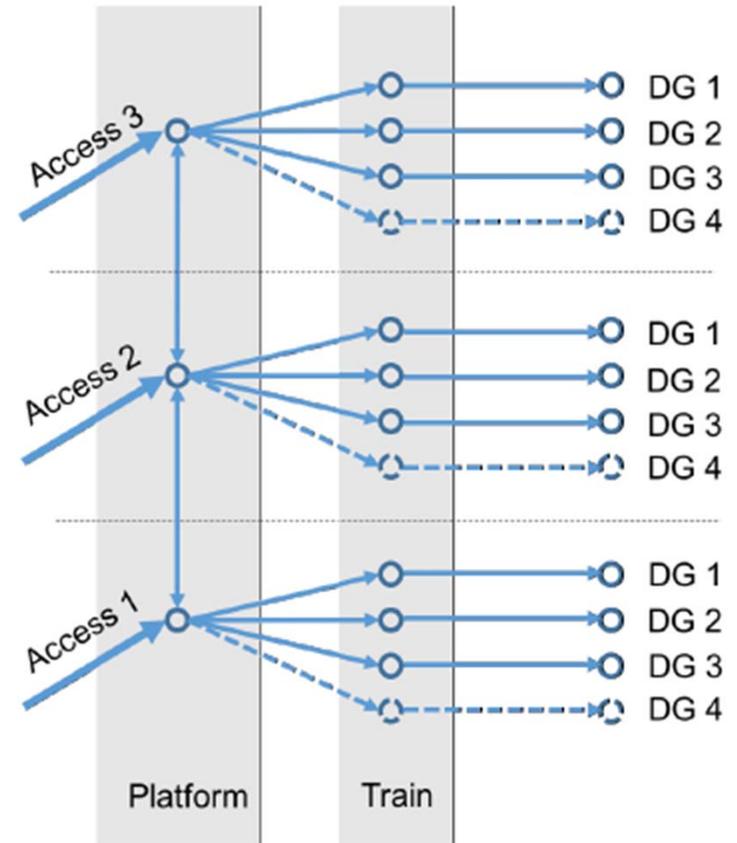
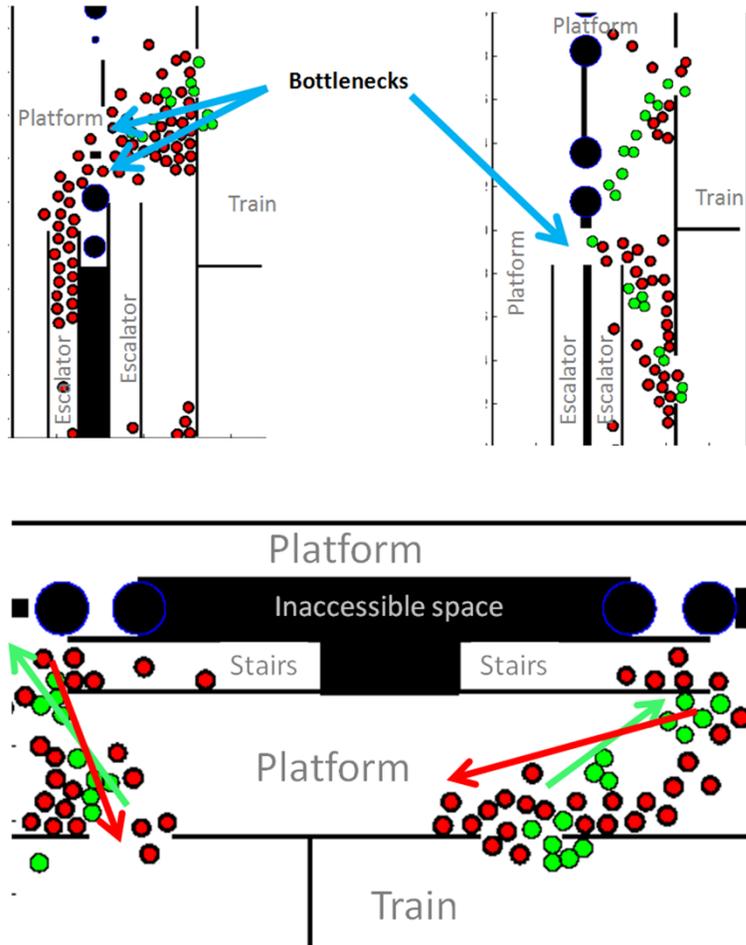


Pedestrian traffic in railway stations

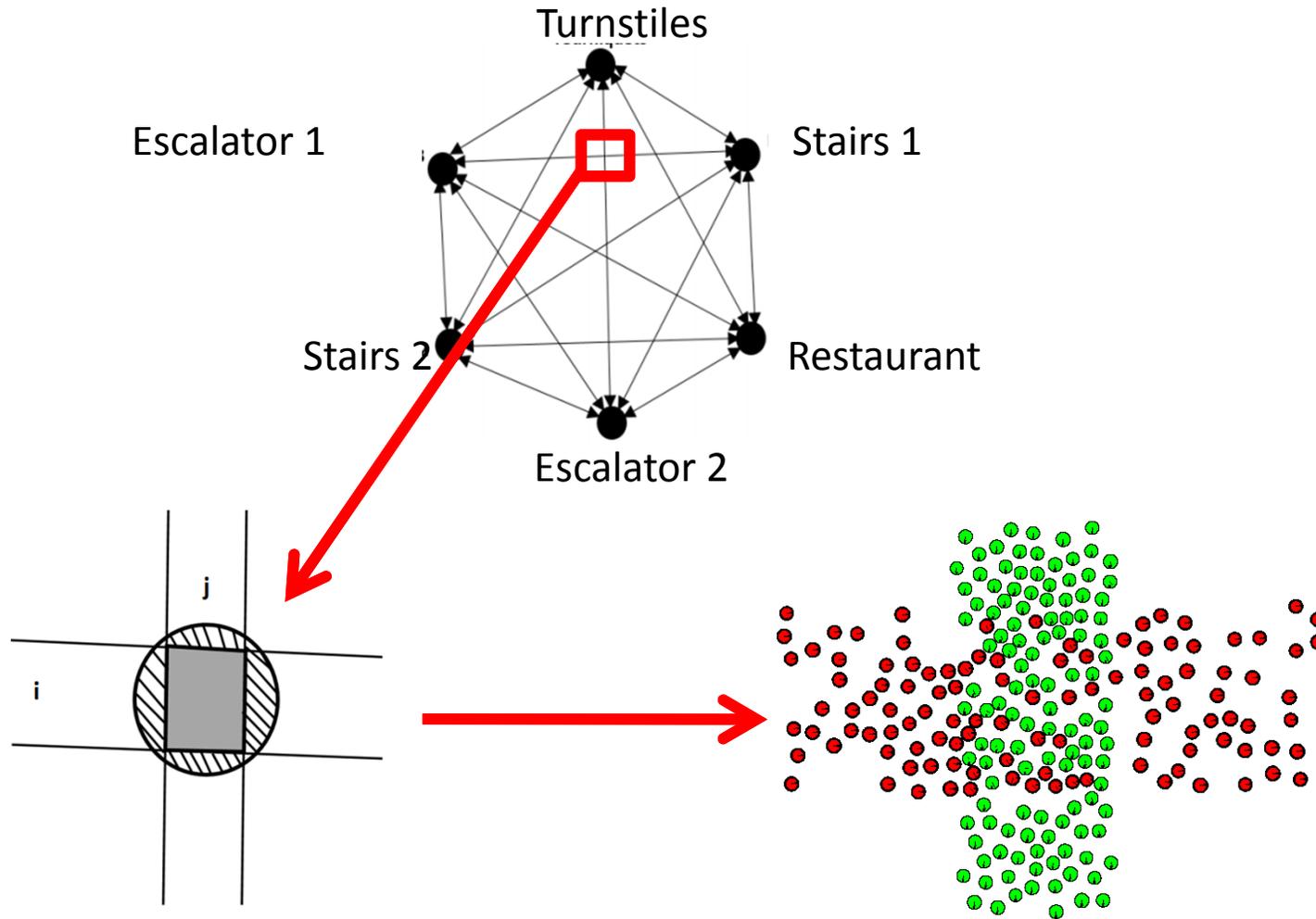
- ❖ Fluidify pedestrian flows:
 - Optimal circulation conditions
 - Identifying pinch points
- ❖ Study the interaction between different elements of the infrastructure
- ❖ Manage pedestrian flow to optimize train traffic operations



Micro v.s. Macro modelling



Joint modelling



CONCLUSION

- ❖ Dynamic simulation is an efficient tool for:
 - Design & conception
 - Assessment of scenarios
 - Inside rail Station, and interactions related to outdoor Station's perimeter: interactions pedestrians – vehicles or crowd behaviour).
- ❖ Ongoing research to improve interactions within modelling process.



THANK YOU
GRACIAS

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