# Assessing Moscow Metro Station Bl
# Simulation Softwar

Passenger Terminals

## Problem

The Moscow metro is Europe's busiest and most expansive subway system in terms of annual ridership, and it is Russia's most dynamic means of transportation. Every year new metro stations are built and the existing metro facilities are reconstructed. The latter includes the renovation of station antechambers, the creation of additional entryways, and the

enlarge the existing antechamber to increase the passenger flow, replace the escalator belts, and add an extra escalator in the rundown corridor to the Arbat-Pokrovskaya line. To evaluate the project design, they contracted the specialists of the **Institute for Development of Transportation Systems (IDTS)**.

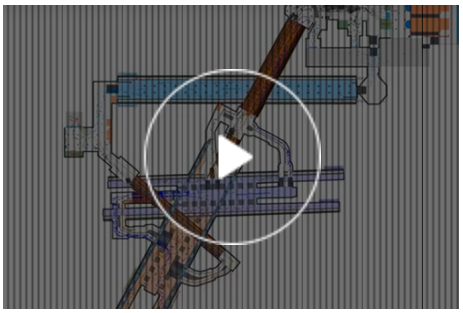
The consultants were asked to develop a pedestrian simulation model in order to:

- Conduct crowd dynamics simulation and analysis to identify solutions for the efficient organization of passenger flows at the antechambers of the station, including options with and without interior redesign.
- Analyze operations at the station with an increased number of escalators.
- Perform evacuation simulation and evaluate the time required for the evacuation of passengers from station platforms.
- Provide recommendations for operating process optimization during the subway station reconstruction.

To this end, the consultants created a simulation model of the subway station using AnyLogic pedestrian modeling software.

## Solution

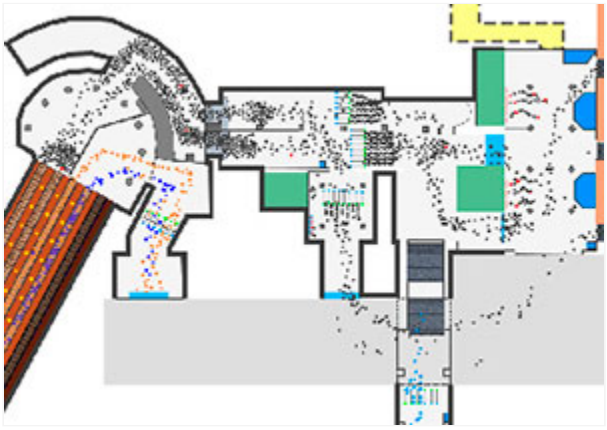
In the initial phase, the specialists developed a baseline simulation model that reflected



behavior in the loading and unloading areas of stairways and escalators.

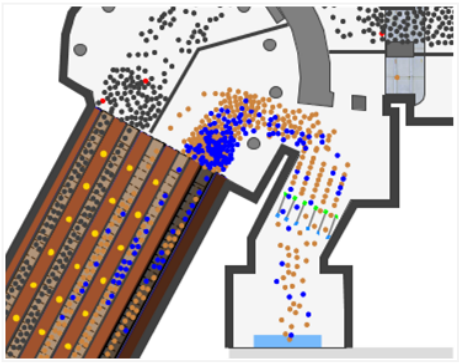
With the completed model, the consultants analyzed different topological options for the antechamber entrance design and selected the most efficient options, with and without building redesign.

Current status (click to enlarge)



An option without building redesign (click to enlarge)

only in rush hours, the exit antechamber would be unable to handle the expected passenger flow because the escalator unloading area would become congested with passengers.



Congestion of passengers leaving the escalators

## Result

The customer was issued the simulation models for further experiments, with the user interface module allowing them to change the following parameters:

- Intervals between subway trains;
- Passenger distribution among the train destinations;
- Number of services in operation: ticket windows, ticket machines, turnstiles;
- Passenger service time;
- Escalator operation mode;
- Ridership characteristics embarking on and disembarking from

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