BE S²ECURE

Built Environment Safer in Slow and Emergency Conditions through behavioUral assessed/designed Resilient solutions

WP4–Human factors simulation in BETs and definition of a related behavioral-based (B-based) resilience metric

T4.1 Development of simulation model including human behavior representation and BETs modifications for selected SLOD/SUOD

D4.1.1 – Selected SLOD/SUOD simulation tool for BETs delivered

ABSTRACT. Simulation models can support risk and resilience assessment in the Built Environment (BE) if they can evaluate the interactions between the BE users and the BE features, its possible hazards and the effects of such hazard on the BE itself. To this end, this deliverable develops a combined simulation models according to an agent-based methodology, to effectively represent the features and the rules aiming each individual receptor at risk, as well as their mutual interactions. The model uses data from D3.2.3 to derive exposure inputs over the time to apply them in the BE Typologies (BETs) as provided in D3.2.1. The users' position in the BET depends on BETs morphological, vulnerability and use as well as on long time-dependent boundaries, such as those of Slow Onset Disasters (SLODs - heatwaves and pollution implying the permanence of users in the outdoor BET). Sudden Onset Disasters (SUODs) are considered as stressors implying evacuation in (earthquake) or from (terrorist act) the BET. The model shares a unique architecture based on the NETLOGO platform, and adopts a microscopic approach to simulate the BE users' behaviours according to T1.2, T1.3 and T2.2 outcomes, representing each individual features (including age, gender, motion abilities and so on) and behaviours in respect to the BET elements (i.e. depending on their characterization and selection given in D3.2.1) and the BET modifications due to the specific SLOD/SUOD (i.e. depending on the results of D3.2.2). Simulations are organized to evaluate each risk in a separate manner for each BET, thus demonstrating the model capabilities and providing basic validation according to the experimental results of WP1 and WP2. Then, basic key metrics (e.g. evacuation times for SUODs; exposure time for SLODs), are defined, being the bases for T4.2 activities on the behavioural-based Key Performance Indicators (KPIs) and metrics development.