

## STREETS4ALL – Dynamic and Equitable Reallocation of Urban Street Space

### Summary

Urban space is scarce and transport facilities use a significant amount (~20%) for roads, parking, and other uses. This space has been inequitably preferring motorized modes, in particular cars. Today, many cities target the UN's Sustainable Development Goals by favoring people-centric planning after decades of car-centered planning. Besides, urban street space is often idling. Congested streets and avenues during peak hours are often underutilized in off-peak hours. On-street parking in residential areas is scarce overnight but idling during the day when residents leave to work. So, planners could reallocate unused street space for other transport modes (e.g., bus or cycling lanes) or urban functions (e.g., markets, promenades), equitably. Such approaches exist today, e.g., nighttime parking or on-street weekend markets. However, they are local and static. They follow a fixed rule or they are temporary like tactical urbanism, e.g., pop-up cycle lanes. Overall, they are not demand-responsive and do not adapt to changing requirements of accessibility or mobility. The limited literature points to an increase in the dispute for scarce urban space. STREETS4ALL proposes an Equitable and Dynamic Allocation of Urban Street Space to accommodate the future multi-modal and multi-functional street' uses. We will investigate street design solutions that can adapt its function and use equitably for all modes over time, during predetermined time lengths (e.g., an hour, few hours, or days) and at pre-timed periods (e.g., peak or off-peak hour, day or night time). STREETS4ALL will answer 3 research questions: 1) Where can we dynamically change street functions to meet varying mobility and accessibility requirements without severely compromising current users' level of service? 2) When and how can such changes be made? 3) What are the corresponding effects on accessibility and mobility, such as the energy, environmental, health, and safety impacts? How do users of all ages and abilities accept such solutions? Lisbon is our case study for 4 reasons: - It has a robust Green Agenda (<https://lisboagreencapital2020.com/>) and is investing heavily in infrastructures for active modes; - Transportation network companies (e.g., bike and scooters sharing) and users are growing; - Lisbon has a high car dependency and a diminishing share of public transport (which the COVID-19 social isolation measures are intensifying); and - The research team has ample knowledge and prior research on urban

mobility and accessibility planning in Lisbon. It has easy access to key stakeholders, facilitating data acquisition, application, and output dissemination. A mixed methodological approach will select the testbed areas for street-space reallocation in Lisbon and evaluate its effects. We will map the areas of Lisbon prone to street-space reallocation based on Multicriteria Analysis. Demand-side variables include street activities (e.g., traffic flows, commercial activities). The supply-side includes street (e.g., speed, capacity) and network (e.g., connectivity, centrality) variables. Together with Lisbon's municipality, we will select 3 sites for testbeds (a street, a plaza, a boulevard). We will collect data 24/7 over a typical week to evaluate modal patterns (e.g., trajectories, speeds). The counting and directional movement data will feed base-case microsimulation models using Siemens' AIMSUN software. We will include the surrounding areas to capture possible traffic detours caused by capacity reduction of streets. Our models will simulate the mobility pattern changes caused by several street-space reallocation solutions defined together with the municipality and Siemens (our technological partner). Please refer to the support letters attached to this proposal. We will use EMEP/EEA guidelines [1] to evaluate the impacts on energy consumption and emissions. WHO's HEAT tool will assess changes in physical activity and the safety of active modes. Finally, we will evaluate the technological and legal requirements of STREETS4ALL solutions. Also, we will lead focus groups in the 3 selected sites to deeply understand how users (residents, store owners, visitors) might accept STREETS4ALL solutions. This research consortium has solid roots and significant experience with multi-objective analysis [2-6], accessibility and performance metrics of active modes [7-12], urban studies [13-14], and energy and environmental impacts [15-17]. Furthermore, our students will be researching under the Ph.D. of Transport Systems, launched in the framework of the MIT Portugal Program, and jointly offered by the Universities of Lisbon (IST), Coimbra (FCTUC), and Porto (FEUP). STREETS4ALL will provide city managers with guidelines and tools to implement equitable and dynamic street space reallocation solutions. Ultimately, we will promote better living urban environments, especially when uncertain and radical changes occur such as COVID19 pandemic.

### Project Reference

PTDC/ECI-TRA/3120/2021

### Leading Institution

IST-ID – Associação do Instituto Superior Técnico para a Inovação e Desenvolvimento (Portugal)

### Partners

UC – University of Coimbra (Portugal)

### CERIS Principal Investigator

Filipe Moura  
([fmoura@tecnico.ulisboa.pt](mailto:fmoura@tecnico.ulisboa.pt))

### CERIS Research Team

Ana Morais de Sá, Patrícia Baptista, Paulo Cambra, Rosa Félix, Manuel Marques, Gabriel Valença, Freddy Nogueira

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### CERIS

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### Project Website

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