



Research School for Operations
Management and Logistics

Smart Multimodal Urban Logistics

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This research is positioned in the area of emerging technologies for smart urban logistics, connecting different transport modes and representing them as a cyber-physical system. We focus on decision support systems for last-mile, multimodal delivery problems, which deal with customer-centered and operational cost objectives, following trends in automatization of transportation systems. We plan to work on problems related to: robots and vehicles with independent tasks, robots and vehicles as synchronized working units, and truck-based deliveries combined with autonomous robots. Specifically, this investigation is focused on the traveling salesman problem with drone, the flying sidekick traveling salesman problem, the vehicle routing problem with drones and robot stations. This research project pays special attention to real application scenarios. Consequently, we aim to establish new problems that face daily operational aspects, such as time-dependent travel times, time-dependent services times, charging of electric vehicles, time windows, staffing and fleet sizing, wind and energy consumption, and multiple stations for transfers between modalities. Additionally, distribution systems face changing environments with unexpected events. For this reason, we aim to extend the static problems by incorporating dynamism, such as stochastic handling times, services times, launching and landing times, and battery consumption, uncertainty in customer availability, and traffic congestion.