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Motivation / Background

>Year after year growth of online sales with home delivery >Customers demand faster delivery



Key Question / Hypothesis

How much can drones reduce delivery times and costs of parcel deliveries in urban environments?

Relevant Literature

- Dayarian, I., Savelsbergh, M. and Clarke, J. (2017) 'Same-Day Delivery with Drone Resupply'
- Dorling, K. et al. (2017) 'Vehicle Routing Problems for **Drone Delivery**'
- Ulmer, M. W. (Technische U. B. and Streng, S. (Technische U. B. (2018) Same-Day Delivery with Pickup Stations and **Autonomous Vehicles.**

Drones and Trucks for Expedited Deliveries



- Only studies on very simplified environments with a limited number of customers, drones and trucks.
- Three delivery models in an urban setting and conduct experimental analyses

Methodology





Initial Results Influence of Transporter Influence of Transporter **Quantity on Total Truck** Quantity on Average Simulated Package Delivery Time **Travel Distance** ε^ο Z **\$000 —** Trucks Pli≤ **Å** 3 aveled ag 3 -0 Drones -1 Drone 1 UCe -2 Drones -3 Drones Dista -4 Drones Number of Delivery Trucks Number of Trucks

Expected Contribution

- New insights and confirm theoretical models.
- Base for future studies that involve vehicle routing and drone deliveries in the urban environment.
- Estimate the impact of changes on currently unknown factors, such as technological advancements and FAA rules.

Truck stop Truck route Old truck route New truck route Drone Destination Drone route

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