# 'Integrate Technology for Efficiency in Urban Goods Delivery System...' Urban Freight Lab Research Project

Barbara Ivanov
Director, Urban Freight Lab (UFL)

Metropolitan Washington Council of Governments Freight Subcommittee Meeting
July 11, 2019

# Are Cities Ready for an Explosion of E-commerce?



A 20% e-commerce compound annual growth rate (CAGR) would more than double goods deliveries in 5 years.

If nothing changes, this could double delivery trips in cities; thereby doubling the demand for load/unload spaces.

# Growth in on-demand passenger services

Ride-hailing services such as Uber and Lyft are also creating new demand for load/unload spaces at city curbs.

In 2018 Lyft averaged 50 million rides a month; while Uber averaged 450 million rides per month.

These services create a negative feedback loop affecting curb demand, as parking problems are the top reason people use the service instead of driving.



Photo by AP, Feb. 25, 2018

# The Urban Freight Lab

- Partners with the Seattle Department of Transportation (SDOT) and other agencies.

- Uses a systems engineering approach to solve delivery problems that overlap cities' and businesses' spheres of control.

- Generates and pilot tests promising solutions inside urban towers and on city streets.

- https://www.youtube.com/watch?v=VphFYgcdPtA

## UFL Members

- **Boeing HorizonX**
- **Expeditors International of Washington**
- **Ford Motor Company**
- **GM**
- **Kroger**
- **Michelin**
- **Nordstrom**
- **PepsiCo**
- **Terreno Realty Corporation**
- **UPS**
- **USPack**
- **USPS**

# The Final Fifty Feet is a New Research Field

The Final 50' projects are the first time that researchers have analyzed both the street network and cities' vertical space as one unified goods delivery system.

The Final 50':

- Starts when a truck driver parks;
- Includes their activities as they maneuver over curbs, along sidewalks and through intersections;
- Ends inside urban towers when they complete their deliveries.



Photo by Urban Freight Lab, UW

# Final 50' Research Goal #1

**Reduce dwell time,** the time a truck is parked in a load/unload space.

Public and private benefits include:

- Lower costs for delivery firms, and therefore potentially lower costs for their customers;

- More efficient use of truck load/unload spaces creates more capacity without building additional spaces; and

- Room for other vehicles to move through alleys.



Photo by Urban Freight Lab.

# Final 50' Goal #2

**Reduce failed first deliveries** to:

- Improve urban online shoppers' experiences and protect retailers' brands;

- Lower traffic congestion in cities, as delivery trucks could make up to 15% fewer trips while still completing the same number of deliveries;

- Cut costs for the retail sector and logistics firms;

- Cut crime and provide a safer environment.
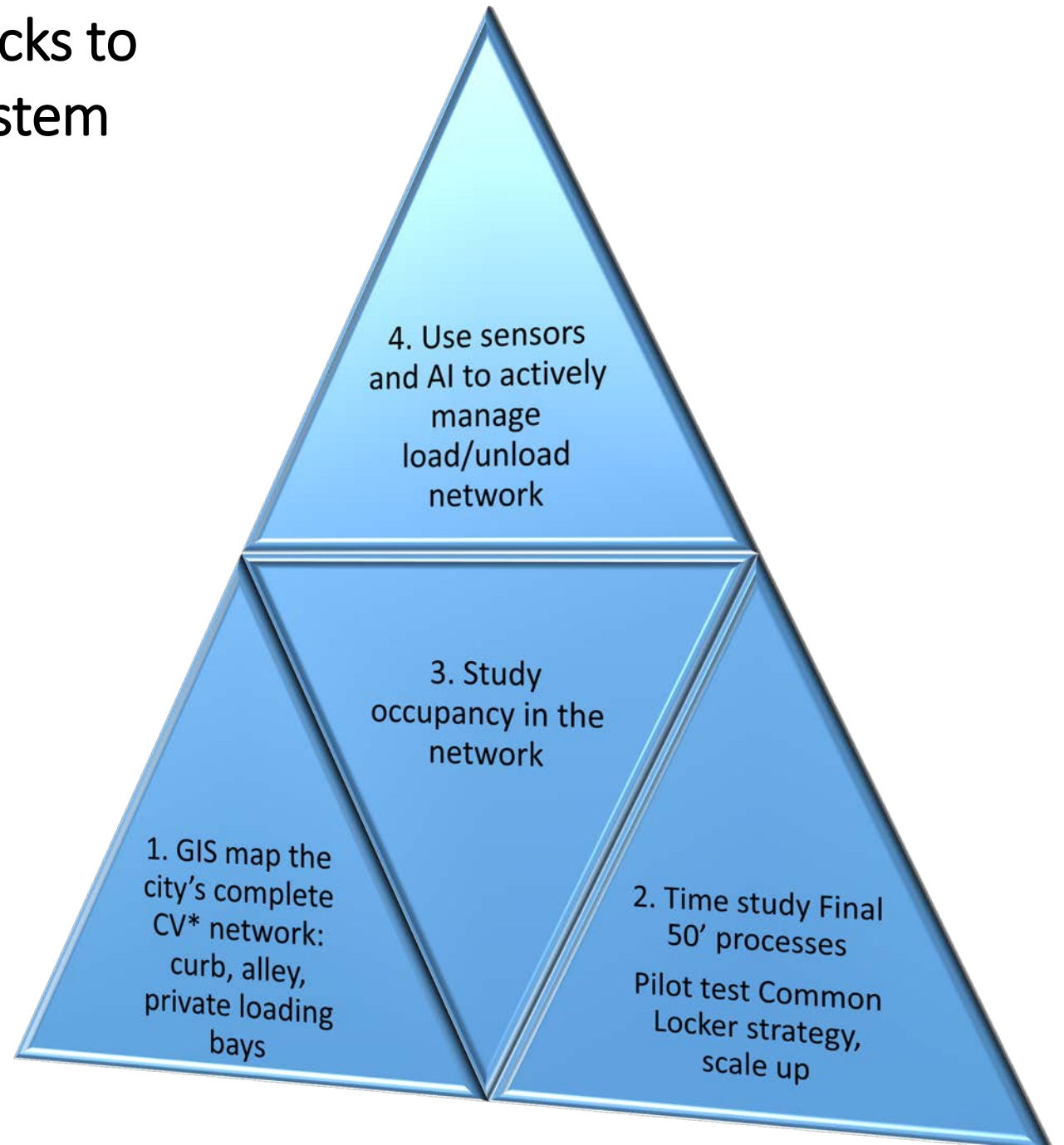


Photo by Urban Freight Lab, UW.

# UFL and SDOT Developed Building Blocks to Improve the Urban Goods Delivery System

These research building blocks enable city transportation professionals to move from:

- Uncertainty to evidence-based strategies, and

- Inaction to implementation of practical, tested strategies.

Each building block fits together, enabling the city, retailers, delivery firms, and building managers to meet common goals.

*CV: Commercial Vehicle



4. Use sensors and AI to actively manage load/unload network

3. Study occupancy in the network

1. GIS map the city's complete CV* network: curb, alley, private loading bays

2. Time study Final 50' processes
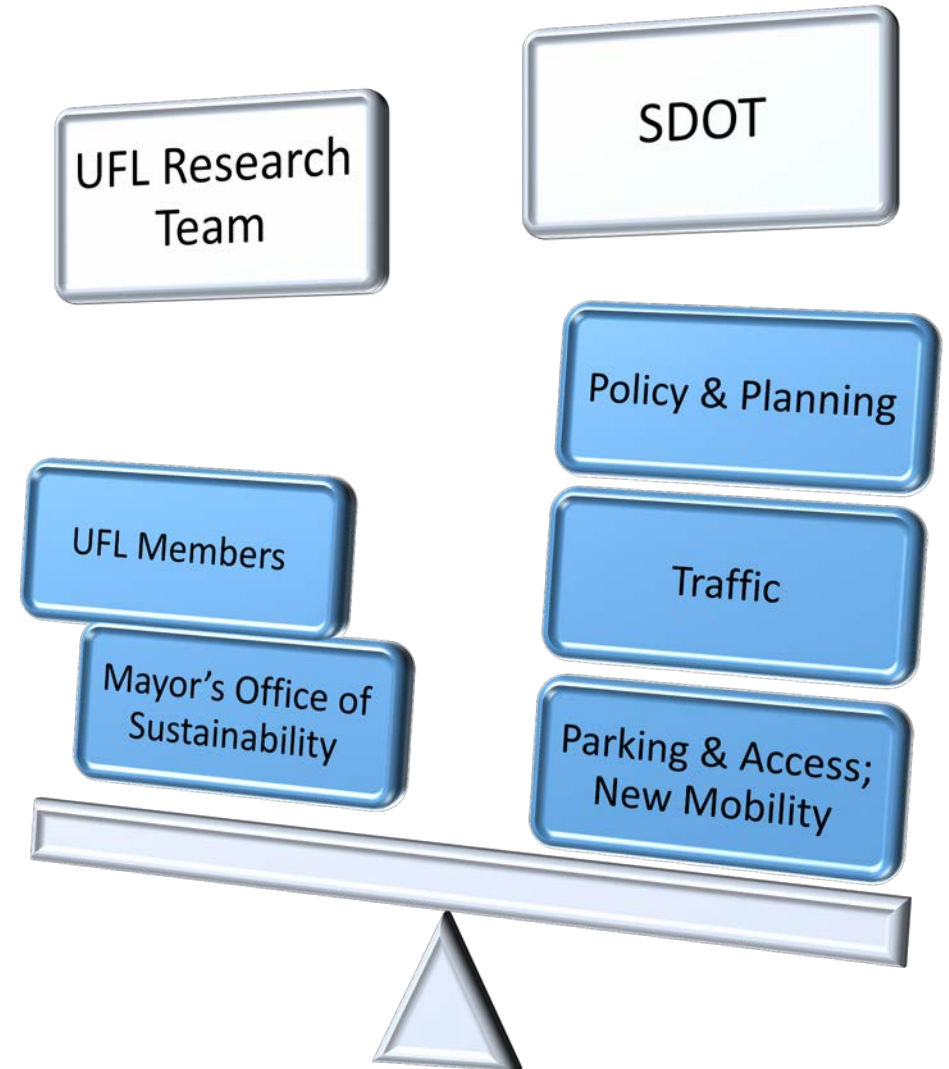Pilot test Common Locker strategy, scale up

# Running Real-World Pilots Requires Constant Coordination

The UFL research team's key functions are to:

1. Listen carefully to understand priority urban delivery problems facing retailers, delivery firms, property managers, ITS firms, and cities.

2. Develop research project plans based on customers' goals. Customers pay for the research.

3. Recruit decision makers (who control the urban delivery processes affected in the research) onto project work teams.

4. Facilitate the problem-solving work teams to goal.

5. Collect and analyze original and existent data.

6. Pilot test promising strategies in the real world.

7. Objectively report on findings.



UFL Research Team

SDOT

UFL Members

Policy & Planning

Traffic

Mayor's Office of Sustainability

Parking & Access; New Mobility

# Urban Freight Lab Awarded $1.5 M Grant to Integrate Technologies to Actively Manage Seattle's Load/Unload Network



The U.S. Department of Energy: Energy Efficiency & Renewable Energy Agency's Vehicle Technologies Program funded this 3-year project to:

1. Reduce parking seeking behavior by approximately 20% in a pilot test area.
2. Reduce parcel truck dwell time by approximately 30%.
3. Increase business efficiency by increasing turnover in load/unload spaces.

# 'Integrate Technology to Gain Commercial Efficiency for the Urban Goods Delivery System….Reduce Energy Consumption' Research Project

1. The Urban Freight Lab research team, working with the Pacific Northwest National Lab, will:

- Install occupancy sensors in commercial load spaces in an 8-block area in Seattle, and in downtown Bellevue.

- Apply machine learning to data streams from the sensors.

- Send real-time and predictive parking availability information to delivery drivers and dispatchers.

**Occupancy Sensor Sends Data**

**Machine Learning**

**App – 'Commercial Parking Space Available in X Minutes'**
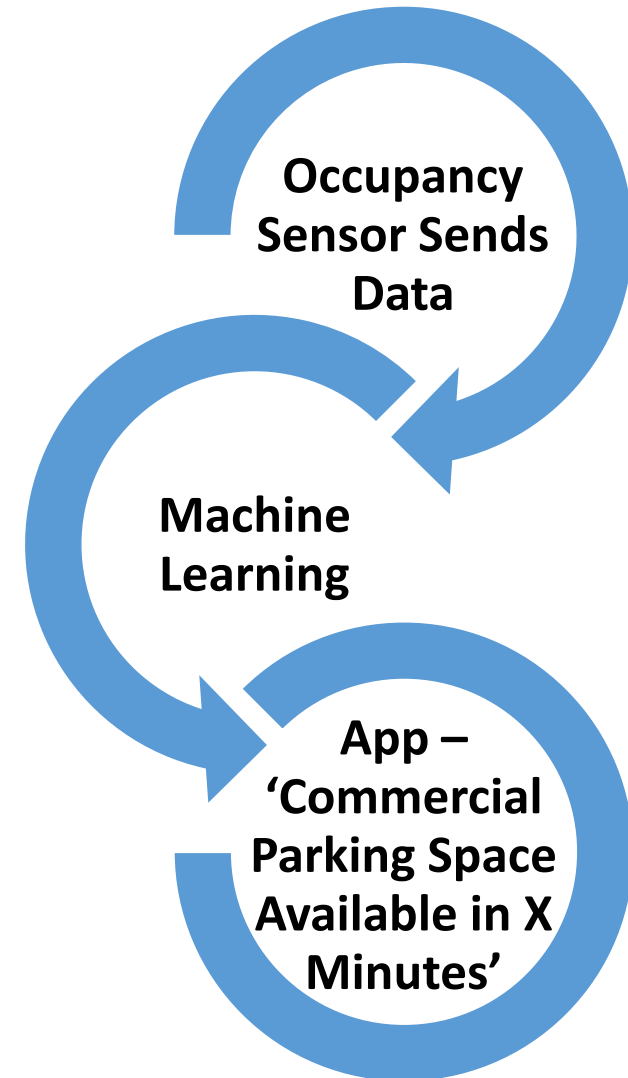
# 'Integrate Technology to Gain Commercial Efficiency…' Research

2. The UFL will create delivery density and security by placing common locker systems near load/unload zones and transit stops in the pilot test area.
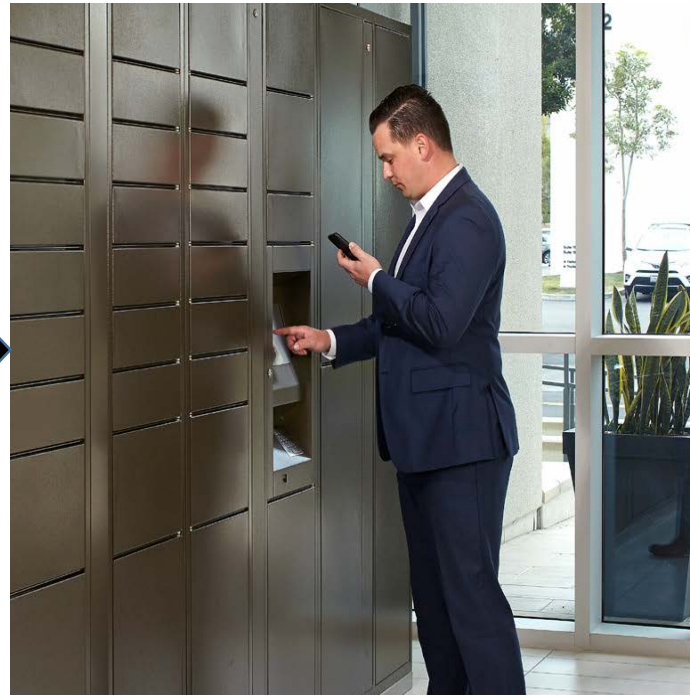


Photo by Urban Freight Lab, UW

Photo owned by Parcel Pending

Photo by Urban Freight Lab, UW

# 'Integrate Technology to Gain Commercial Efficiency…'

3. Engage building managers to offer loading bay spaces to other users in off-peak delivery hours.





Seattle Municipal Tower, a 62-story office building studied in the Urban Freight Lab

# Questions?

**Please contact:**

Barbara Ivanov

Urban Freight Lab Director

Supply Chain Transportation and Logistics Center COO

University of Washington

ivanovb@uw.edu

http://depts.washington.edu/sctlctr/

**To view the Final 50' suite of published research reports please go to**
http://depts.washington.edu/sctlctr/research/publications

**Highlights of the Urban Freight Lab's current research projects are at**
https://depts.washington.edu/sctlctr/research-projects/current