

United States - European Commission Urban Freight Twinning Initiative: Compendium of Project Summaries, Volume II

Overview of 2018-2019 International Urban Freight Roundtables



U.S. Department of Transportation
Federal Highway Administration



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E-trike Pilot in Seattle. Source: Seattle Department of Transportation.

New York City Truck. Source: USDOT Volpe Center.

Boston Curbside Delivery. USDOT Volpe Center.

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INTRODUCTION

Freight and transportation practitioners in urban areas continue to work with one another and in collaboration with the private sector to identify and deploy strategies to manage congestion and to ensure the efficient and safe provision of urban transportation. Given the pace and evolution of economic, technological, and other trends, public and private sector freight practitioners must be equipped to address the new and emerging realities of delivering goods to diverse urban areas across the globe.

This compendium provides high-level descriptions of ongoing or recently completed international urban freight initiatives which were shared at the 2018 and 2019 International Urban Freight Roundtables (Roundtables). The Roundtable is an annual event sponsored by the U.S. Federal Highway Administration (FHWA) in cooperation with the European Commission (EC). The roundtables seek to provide stakeholders with new and emerging practices in the management and operations of urban freight fleets to maximize both public and private benefit while minimizing negative externalities that may be associated with urban freight deliveries. Private and public sector officials who are deploying innovative freight strategies attend the Roundtables. The goal of the Roundtable and the annual compendia is to help a network of urban freight professionals who together engage in cross-cutting collaborations to address the field's most pressing issues.

The strategies presented in this compendium range from research and regional/metropolitan planning efforts to pilot demonstrations and policy initiatives. Many of the themes of the inaugural (2017) edition reappear in this second edition of the compendium. For example, many stakeholders are continuing data collection and analysis on urban freight infrastructure such as curbside loading zones. However, the 2018 and 2019 Roundtables included additional topics not addressed in the 2017 event. For example, a new and notable topic at the 2018 and 2019 Roundtables was the education and development of a workforce capable of tackling today's most pressing issues in urban freight. This compendium describes projects such as continuing education certification and efforts to expose secondary and post-secondary students to freight and logistics careers.

FHWA understands the critical importance of safe, efficient, and reliable urban goods movement. It is committed to helping States, metropolitan planning organizations (MPOs), cities, and other stakeholders improve the management of urban freight flows. FHWA is currently developing resources, including this publication, which cover a range of topics and can assist partners in implementing improved strategies for improved freight mobility.

ABOUT THE FHWA-EC TWINNING INITIATIVE

The FHWA-EC Twinning Initiative promotes coordination and information exchange on areas of urban freight research and innovation that are of mutual interest and benefit to both agencies. The initiative highlights urban logistics projects funded by the EC and research projects and other urban freight activities sponsored by FHWA.

The EC-funded projects are part of Horizon 2020, the EC's latest research and development program. Horizon 2020 project leads are large public-private consortia that work on research and deployment of urban logistics initiatives. The projects involve pilot testing of urban freight strategies in as many as 20 European cities.

FHWA-sponsored projects include a guidebook on context-sensitive design for freight practitioners, primers that identify a range of urban freight strategies, freight noteworthy practices, international peer exchanges, webinars, and other activities. Collectively, these FHWA projects seek to define major challenges facing freight transport in U.S. cities and highlight innovative practices to address those challenges.

GUIDE TO USING THE COMPENDIUM

This compendium is comprised of 48 summaries describing urban freight initiatives that include research projects, freight plans, and pilot demonstrations, among other types of efforts. Each summary details how stakeholders are working together to implement strategies that lead to freight planning, project delivery, and mobility improvements both in the U.S. and abroad. The summaries present the key challenges addressed by each initiative, the expected or realized outcomes, and stakeholder(s) involved in planning or implementing the initiative. Each summary also includes contact information. The reader is encouraged to reach out to the identified contacts with questions or requests for additional information. Through fostering these connections, the compendium aims to strengthen the urban freight community of practice that spans not just the nation but also reaches across the globe.

The project descriptions in this compendium are not meant to be comprehensive overviews but instead are short, “digestible” summaries that allow the reader to effectively identify peer projects and practitioners with whom they would like to engage further.

Readers can use any of the following aids to identify urban freight initiatives of interest and learn more about them:

- **Project Summary Table:** Table 1 on the next pages categorizes projects by type of effort, location (e.g., United States, Europe, other international), and general topic area(s) addressed.
- **Tabs:** Colored tabs, which are located on the top-right corners of each summary, indicate the project’s type of effort and its location. The colors correspond to those used in the project summary table.
- **Contact Information:** The summaries include contact information to help the reader reach out directly to project leads to exchange information or ask questions about a specific project.
- **Year of Submission:** Year the project was presented at the TRB Annual Meeting is listed at the bottom left corner of each project page.

GUIDE TO PROJECT SUMMARIES IN THIS COMPENDIUM

Page #	PROJECT LEAD	PROJECT NAME	PROJECT TYPE				LOCATION			TOPICS ADDRESSED																
			Research	Metropolitan/Regional Plan	Policy	Pilot	United States	European Union	Other International	Air Quality/Environment	Building/Road Design	Curbside Delivery & Parking	Economic Competitiveness	Energy Consumption	Land Use Interaction	Last Mile Delivery	Livability/Quality of Life	Logistics/Distribution	Mobility/Congestion	Modeling	Off-Hours Delivery	Safety	Supply Chains	Workforce Development	Other	
7	Urban Freight Lab of the University of Washington	Alley Inventory and Truck Occupancy Study	•	•	•	•																				
8	UPS: United Parcel Service	Alternative Last Mile Delivery Methods			•																					
9	Rensselaer Polytechnic University	Assessing the Impacts of Congestion on Supply Chains in Haiti	•																							
10	Transportøkonomisk Institutt - TØI	CITYLAB - City Logistics in Living Labs	•																							
11	Urban Freight Lab of the University of Washington	Curb Space Truck Occupancy Study	•	•	•																					
12	METRANS/CalState Long Beach	Design and Delivery of an Urban Freight Transportation Management Planning Certificate				•																				
13	Rensselaer Polytechnic University	Developing an Eco-Transfer System for Urban Deliveries	•																							
14	Urban Freight Lab of the University of Washington	Feasibility Study for a Common Carrier Locker System Pilot Test	•	•	•																					
15	Texas A&M Transportation Institute	Freight Fluidity Implementation	•																							
16	Rensselaer Polytechnic University	Impacts of Policy-Induced Freight Modal Shift			•																					
17	University of Southampton	Increasing Operational Collaboration Among Freight Carriers				•																				



Freight truck parked in a Seattle alley.
Source: Urban Freight Lab University of Washington, 2017

ALLEY INVENTORY AND TRUCK OCCUPANCY STUDY

This research project, which is part of the Urban Freight Lab's Final 50 Feet series, uses geographic information systems (GIS) to map the locations and features of all alleys in Seattle's Center City, which includes downtown, uptown, South Lake Union, Capital, and First Hill urban centers. The Seattle Department of Transportation (SDOT) had curb data layers and acquired GIS data on all private truck loading bays and docks in an earlier Final 50 Feet project, but it lacked information on the city's alleys needed to build a comprehensive truck load/unload space network. This research also includes a truck occupancy study in select alleys. Seattle is one of many major U.S. cities that have alley networks. Alleys are a critical part of the truck infrastructure network in cities as they primarily function as truck-only load/unload areas and throughways. In addition to Seattle, major cities with alley networks include Chicago, Denver, Detroit, and Minneapolis.

Project Types

Research, Metropolitan Plans, Policy.

Period of Performance

December 2017 - July 2018.

Project Site

Seattle, Washington, USA.

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Topics Addressed

- Building/road design.
- Curbside delivery and parking.
- Economic competitiveness.
- Land use interactions.
- Last mile delivery.

Key Outcomes

The Urban Freight Lab (UFL) alley infrastructure survey has geocoded the alley locations and measured the narrowest points and turn radii of the entrance aprons, and other truck-related features of the city's alleys so the city knows the maximum-size vehicles (waste pick up, delivery, and emergency vehicles) that can park in and/or pass through them. It has categorized alleys by truck usage and design characteristics. A forthcoming report on the alley truck occupancy study will provide a deeper understanding of how trucks use alleys in dense cities in context with curb space parking and private truck loading bays and docks to serve city businesses, workers, and residents. Key findings from the study include:

- Over 90% of all alleys in Center City are only one lane wide, and therefore one parked vehicle blocks the entire alley.
- Vehicles parked in alleys were studied with 68 percent there for less than 15 minutes and 87 percent parked 30 minutes or less. The vast majority of cars and trucks load/unload quickly in alleys.

Stakeholder Involvement

SDOT is funding this research, set the parameters of the project, and may use the information to support development of data-based Alley Management Plans and policies. Urban Freight Lab (UFL) researchers designed the research plan and implemented it in 2018. Delivery firms who are members of the Urban Freight Lab (United Parcel Service and United States Postal Service) provided technical insights into the business case for promising strategies based on this analysis that may be pilot tested in the future.



UPS stages its e-trike delivery operation, seen here in Hamburg, Germany, at a series of mini-depots strategically located throughout each city. Source: UPS.

ALTERNATIVE LAST MILE DELIVERY METHODS

Alternative last mile delivery methods, including but not limited to e-trikes, have been piloted in more than 30 cities globally and growing. Building on initial success of a cycle logistics pilot project in Hamburg, Germany, the United Parcel Service (UPS) has rapidly ramped up partnerships with cities and municipalities to provide zero-emissions, human-scaled delivery in dense urban environments where congestion and sustainability concerns are the greatest. Each subsequent pilot project has offered additional lessons learned and is guiding the development of entirely new delivery models and mode-specific delivery vehicles. The success of the projects has been demonstrated not just through their acceptance but by

their measured commercial viability relative to traditional delivery modes. Further research will explore the specific parameters around how to ensure cost parity or even expanded efficiency, with the expectation that continued technological advances and real-world testing will make cycle logistic and other alternative delivery models plausible for widespread adoption. It has also enabled the further refinement of the delivery model and the necessary policy/ land-use considerations that must be taken into account for the model to work at commercial scale.

Project Type

Pilot.

Period of Performance

2014 - Present.

Project Sites

30+ cities, starting in Hamburg, Germany, and expanding to cities such as Seattle, Pittsburgh, Ft. Lauderdale, London, Paris, Dublin, and many more.

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Topics Addressed

- Air quality/environment.
- Curbside delivery and parking.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.

Expected Outcomes

Ongoing pilot projects around the world have been shown to provide a zero-emissions, human-scaled solution that is actually just as—if not more—efficient for the delivery of goods in the right neighborhood typologies and relative density.

Stakeholder Involvement

Stakeholders include UPS, city leaders, transportation officials, local advocates, and business associations. UPS feels this is a truly collaborative approach to develop best practices.

ASSESSING THE IMPACTS OF CONGESTION ON SUPPLY CHAINS IN HAITI

Logistics efficiency has a dramatic impact on trade flows both within and among countries. For a number of reasons, countries in Latin America have historically struggled to develop strong logistics industries. Insufficient transportation infrastructure development and poor provision of transport and logistics services in general have hindered strong supply chains. The Rensselaer Polytechnic Institute (RPI) has developed a methodology to quantify the impacts of congestion on the supply chains that serve Latin American cities.

While developing the methodology, the research team sought to integrate the following characteristics:

- **Applicability:** Should be applicable to the wide spectrum of scenarios found in Latin America;
- **Comparability:** The performance metrics estimated by the methodology should enable comparisons among cities;
- **Practicality:** Should use the minimal amount of data that can provide solid estimates of the performance metrics selected; and
- **Robustness and Verifiability:** The data collected must be solid enough to ensure robust results.

The main goal of this project is to implement the methodology and produce robust estimates of the impacts of congestion on supply chains in Port Au Prince, Haiti.

Project Types

Research, Pilot.

Period of Performance

January 2018 - January 2019.

Project Site

Port au Prince, Haiti.

Contact

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Topics Addressed

- Economic competitiveness.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.
- Supply chains.

Expected Outcomes

The project will produce a final report that summarizes the results of the data collection and analysis, including estimates of key performance measures such as transportation costs per unit time and distance, travel congestion index, and direct externalities produced by freight traffic.

Stakeholder Involvement

The final methodology design integrated the input of stakeholders, including private sector logistic companies and public sector decision makers. The implementation of the methodology includes a process for validating the outcomes with inputs from stakeholders (e.g., private sector) in the system.



The CITYLAB logo.
Source: TØI.

CITYLAB

Goods, waste, and service trips in urban areas impose negative traffic and environmental impacts; there is a need for cost-effective and sustainable solutions. The CITYLAB objective is to develop knowledge and solutions that result in up-scaling and roll-out of strategies, measures, and tools for emission-free city logistics in urban centers by 2030. Using a living lab approach in seven different European cities, the project focuses on four types of intervention:

1. Highly fragmented last-mile deliveries in city centers
2. Large freight attractors and public administrations
3. Urban waste, return trips and recycling
4. Logistics facilities and warehouses

A common goal is the reduction of pollutant emissions from freight transportation in urban centers. The project has a budget of about \$4.8 million (€4 million).

Project Types

Research, Policy, Pilot.

Period of Performance

May 2015 - April 2018.

Project Sites

Amsterdam, Netherlands; Brussels, Belgium; London, United Kingdom; Oslo, Norway; Paris, France; Rome, Italy; and Southampton, United Kingdom.

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Topics Addressed

- Air quality/environment.
- Building/road design.
- Land use interaction.
- Last mile delivery.
- Logistics/distribution.
- Mobility/Congestion.

Expected Outcomes

The website (www.citylab-project.eu) provides useful outputs describing each living lab's outcomes and observations, including:

- An animated video giving an overview of the living lab approach, accompanied by a briefing note giving more details in each city.
- Cartoons telling the story of each urban freight implementation.
- Project deliverables (reports), published articles, presentations, and workshop reports.
- A summary 16-page version of "Observatory of strategic developments impacting urban logistics" covering: logistics land uses and urban sprawl; e-commerce and 'instant' deliveries, and service trips.
- 6 monthly newsletters, providing summary information of all our activities.
- Key statistics from cities, referred to as 'Dashboards.'
- Links to external projects.
- The website will continue to be updated with key outputs including detailed evaluation results for all of the implementations from each city.

Stakeholder Involvement

Public agencies (mainly transport-related), private freight actors, research community, citizens, and goods receivers (e.g. retailers, hospitals). The project is actively disseminating tailored information to 18 'follower' European cities and regions with 9 'transfer' cities selected for active involvement, including training, technical visits, interactive workshops, and transferability analyses.



UPS package truck parked at the curb in Seattle.
Source: Urban Freight Lab University of Washington.

CURB SPACE TRUCK OCCUPANCY STUDY

The Seattle Department of Transportation (SDOT) engaged the Urban Freight Lab (UFL) at the University of Washington to document truck load/unload activities at select streets in its urban centers. This study is investigating how trucks operate in the Final 50 feet of the delivery system, and includes trucks' use of all load zones: Commercial Vehicle Load Zones (CVLZs), 3-minute passenger load zones, and stopping next to fire hydrants and in center lanes to unload goods. Due to Seattle's recently-enacted privacy ordinance, the observations were taken in person, not by video.

Project Types

Research, Metropolitan Plans, Policy.

Period of Performance

April 2017 - August 2018.

Project Sites

Seattle, Washington, USA.

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Topics Addressed

- Building/road design.
- Curbside delivery and parking.
- Land use interactions.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.

Key Outcomes

The findings may be used to help the SDOT develop data-based policies and strategies to:

- Retain curb CVLZs in select blocks;
- Develop new flex-use strategies for short-term (3-10 minute) passenger and/or truck use of curb space; and/or
- Develop mitigation strategies when reducing or removing CVLZs and other load/unload spaces in corridors.

Stakeholder Involvement

SDOT funded the work and defined the project's parameters. UFL researchers developed and implemented the research plan. UFL industry members will provide their businesses' strategic insight into the findings as well as context on how curb space use is changing in response to the growth of e-commerce.

DESIGN AND DELIVERY OF AN URBAN FREIGHT TRANSPORTATION MANAGEMENT PLANNING CERTIFICATE

In 2017, METRANS researchers designed and delivered an Urban Freight Transportation Management Planning Certificate pilot course. This class, which was conducted over four consecutive Fridays in February and March, addressed multi-modal transportation conflicts in urban areas. Participants in this course included employees of the Los Angeles County Metropolitan Transportation Authority (LA Metro) and the California Department of Transportation (Caltrans) as well as representatives of Los Angeles City Council offices. The curriculum was designed to help local planners analyze the potential conflicts between freight and passenger movement planning using a hypothetical Los Angeles case study. Specific topics addressed in the course included:

- Geography of the supply chain and trucking perspective on the passenger-freight conflict;
- Local planning approaches to integrate goods movement into site specific planning and innovative approaches to last mile deliveries; and
- Identifying solutions with the help of a GIS data collection tool.

METRANS is currently developing a complimentary pilot course for consultants who work with transportation agencies in the Los Angeles Metro area. Many of these consultants are expert in transportation and traffic engineering and planning but have not had formal education in urban goods movement.

Project Type

Pilot.

Period of Performance

January 2017 - June 2018.

Project Site

Los Angeles, California, USA.

Contact

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Topics Addressed

- Other: Passenger-freight conflicts.
- Other: Lack of urban freight-specific training materials.

Expected Outcomes

The pilot program will result in curricular materials that will be used in a regular professional development course offering. The walk audit app will be incorporated into both credit and non-credit course offerings.

Stakeholder Involvement

The course was developed in conjunction with LA Metro. Participants from LA Metro, Caltrans and local council offices took part as students and provided valuable feedback on curricular materials and course delivery. LA Metro is assisting with the development of the next pilot, focused on the consulting community, by facilitating access to consultants registered with the agency.



An improvised transfer area by parcel delivery workers—an illegal use of the curbside. Source: Rensselaer Polytechnic University.

DEVELOPING AN ECO-TRANSFER SYSTEM FOR URBAN DELIVERIES

Drivers of commercial vehicles often find that making deliveries in a large metropolitan area is a major challenge due to congestion and lack of parking space. Nowadays, commercial deliveries produce negative externalities such as congestion, emissions, and traffic safety issues. Fostering sustainable delivery modes such as cargo bikes and handcarts provide a promising solution to

the problem; however, such modes have a limited distance range and need space to transfer goods. In addition, transferring goods to cargo bikes involves multiple stakeholders: public agencies, local community, motor carriers, and the sustainable last-leg delivery industry. The goal of this project is to develop an Eco-Transfer System. The project will: (1) Identify locations and time windows of the transfer sites based on the delivery demand, parking supply, and road network condition; (2) Identify barriers, legal or otherwise, to implementation of an Eco-Transfer System; (3) Gain the support of public and private sector stakeholders; and (4) Design a preliminary plan for the implementation of the Eco-Transfer System. This research project is funded by the New York State Energy Research and Development Agency. The research team is led by the Rensselaer Polytechnic Institute (RPI); research partners include City College of New York and Revolutions Rickshaws.

Project Type

Research.

Period of Performance

November 2017 - May 2019.

Project Site

New York, New York, USA

Contact

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Topics Addressed

- Air quality/environment.
- Curbside delivery and parking.
- Economic competitiveness.
- Energy consumption.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Supply chains.

Expected Outcomes

- Diagnosis of the Manhattan area's freight demand, parking space availability, and road network conditions.
- An analysis of the market acceptability for this initiative and legal issues regarding its implementation.
- A preliminary Eco-Transfer System design, a pilot test, and analysis of the corresponding results.

Stakeholder Involvement

The project explicitly requires interviews of the stakeholders involved to gain a thorough understanding of the market and concerns from the public and private sector. Public-sector and private-sector representatives, including traffic management and parking enforcement agencies, truckers, receivers, and potential providers of the sustainable last-leg delivery, will be interviewed.



University of Washington Sound Transit Station, 2017.
Source: Urban Freight Lab University of Washington.

FEASIBILITY STUDY FOR A COMMON CARRIER LOCKER SYSTEM PILOT TEST

The purpose of this project, part of the Urban Freight Lab's (UFL) Final 50 Feet series, is to develop criteria used to evaluate the public and private benefits of locating common carrier delivery locker systems at Sound Transit passenger train stations or neighboring transit-oriented-development (TOD) areas and apply the criteria to evaluate potential sites' feasibility for a pilot test. Common carrier locker systems, unlike company-branded lockers, may be used by multiple delivery firms to hold packages. There are several public benefits of a common-carrier system, including: (1) Prevents one firm from receiving preferential access to public space

and facilities, etc.; (2) Adds an amenity that improves transit passengers' experience at the mobility hub; and (3) Reduces the space requirement for locker systems at stations. The private sector benefits include: (1) Increasing density of deliveries, thereby increasing efficiency; and (2) Reducing the number of failed first delivery attempts (15% of all delivery attempts may fail in cities). Failed delivery attempts cause firms to take the package to an alternate site or back to their distribution centers; either action will add truck trips to congested roadways.

Project Types

Research, Metropolitan Plan, Policy.

Period of Performance

September 2017 - June 2018.

Project Site

Seattle, Washington, USA.

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Topics Addressed

- Building/road design.
- Curbside delivery and parking.
- Economic competitiveness.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.

Expected Outcomes

- Development of a list of evaluation factors, each prioritized as either 'essential,' 'important,' and 'not material.' These will include physical, legal/regulatory, operational, and market-driven factors for siting common carrier locker systems at passenger train stations.
- Application of the evaluation criteria at three Sound Transit train stations in Seattle, resulting in a report recommending site(s) for a pilot test in 2018.

Stakeholder Involvement

Funding and oversight was provided by Sound Transit which owns and operates the train stations, Metro King County Transit which owns the tunnel in which one of the train stations is located, and Seattle DOT. In addition to the public agencies, members of the UFL participated in a facilitated workshop in January 2018 to refine the evaluation factors. Members of the project team and agency representatives used the criteria on a walk-through of three commuter rail stations to evaluate the sites. They identified five viable locations. The UFL research team designed and is implementing the research plan.

FREIGHT FLUIDITY IMPLEMENTATION

The term “freight fluidity” broadly refers to the performance of transportation supply chains and freight networks. In practice, it is a measure of a supply chain’s performance for either one single mode or multiple modes of freight transportation. This project is developing a practical “freight fluidity” framework for tracking and measuring a supply chain’s freight performance using travel time, travel time reliability, and cost as its performance metrics. The framework has been under development for more than a year at Texas A&M Transportation Institute (TTI), and the project team is currently demonstrating and implementing it in several areas around the country. These include Texas (statewide and border fluidity) and Maryland using high truck volume corridors and key activity centers (high-density urban freight locations). The project also provides technical assistance to the development of FHWA’s National Freight Fluidity Monitoring Program Implementation, including identifying appropriate supply chains, data sourcing, and regional implementation through a consultant team. TTI is also developing and implementing a freight fluidity performance management framework for U.S. ports for the U.S. Army Corps of Engineers (Mobile, Alabama port demonstration) and assisting Transport Canada with intercity fluidity measure calculations.

Project Types

Research, Pilot.

Period of Performance

Ongoing.

Project Sites

United States (Texas, Maryland, Alabama) and Canada.

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Topics Addressed

- Air quality/environment.
- Building/road design.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.

Expected Outcomes

Frameworks and implementation/demonstration of freight fluidity concepts at the regional and statewide levels. The eventual goal is national/international supply chain implementation of these frameworks and concepts via a freight fluidity tool or other interface.

Stakeholder Involvement

Federal, State, and local transportation agencies, including Texas DOT, to demonstrate concepts both statewide and at the international border; Maryland State Highway Administration, Colorado DOT, FHWA, Transport Canada, and the Army Corps of Engineers.



Major components that will be included in the final handbook for practitioners.
Source: Rensselaer Polytechnic University.

IMPACTS OF POLICY-INDUCED FREIGHT MODAL SHIFT

For a variety of reasons, freight mode choice is one of the most complex decision-making processes in transportation. Three economic agents play a role in freight mode choice: shippers, carriers, and receivers.

Effective implementation of desired modal shift requires thorough understanding of how these agents respond to various

transportation policies. The objective of this research is to develop a handbook for public practitioners that describes the factors freight agents consider for mode choice and provides an analytical methodology for public practitioners to quantify the probability and outcomes of policy-induced modal shifts. Major research tasks include:

- (1) Studying factors influencing current freight modal shares;
- (2) Conducting interviews with freight agents regarding their mode choice decision-making processes;
- (3) Estimating freight mode choice models using the Commodity Flow Survey's 2012 microdata combined with Longitudinal Business Database, modal attribute data comprising of costs, and travel times of various modes;
- (4) Quantification of public impacts of freight modal shifts; and
- (5) Application of models to case studies.

This project is funded by the National Cooperative Freight Research Program (NCFRP) and is being conducted by the Rensselaer Polytechnic Institute (RPI), partnered with Jack Faucett and Associates (JFA).

Project Types

Research, Policy.

Period of Performance

October 2013 - October 2018.

Project Sites

The research aims at analyzing the modal shifts patterns at any geographic (national, state, or regional) level.

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Topics Addressed

- Air quality/environment.
- Logistics/distribution.
- Modeling.

Expected Outcomes

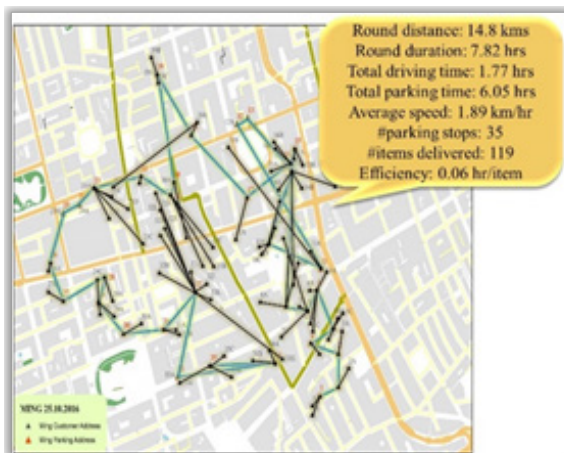
The project will result in a handbook that explains the factors shippers and carriers consider when choosing freight mode. These insights will then set up a framework for modeling the outcomes of policy-induced modal shifts. The guidebook and framework are intended to be used by public agencies who are considering enacting policies aimed at shifting mode choices by the freight industry. To do this, it will provide statistical probabilities for modal distribution of a given policy's outcomes and help to anticipate any unintended outcomes of the policy.

Stakeholder Involvement

There are many stakeholders from public and private industry involved in this study:

- Public agencies: NCFRP, Federal Railroad Administration, and the Census Bureau.
- Private agencies: JFA, Caliper Corporation, and private firms that participated in the in-depth interviews.

INCREASING OPERATIONAL COLLABORATION AMONG FREIGHT CARRIERS



A visualization of a parcel carrier's round in London showing walking trajectories (black lines). Source: University of Southampton.

Freight transport currently makes up about 16 percent of all road vehicle activity in European cities. By 2030, the European Union would like to see logistics systems, which are largely carbon dioxide-free, operating in urban centers. Though freight traffic in London is expected to grow by 20 percent by 2030, the industry has been slow to switch to alternatively fueled and electric freight vehicles; more radical strategies are needed to reduce the numbers and impacts of freight vehicles in cities. Working with some major parcel carriers in London, this project is examining the potential for increased operational collaboration among carriers to reduce urban traffic and energy demand while maintaining customer service levels. This project will also evaluate to what extent such relationships can develop naturally within a commercial setting or whether a third-party "Freight Traffic Controller" (FTC) would be

necessary to ensure equitable distribution of demand across a city. Additionally, the project is investigating the role that portering could take in improving efficiency in last mile parcel logistics by increasing the amount of consignments moved on foot.

Project Types

Research, Pilot.

Period of Performance

April 2016 - March 2019.

Project Site

London, United Kingdom.

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Topics Addressed

- Air quality/environment.
- Curbside delivery and parking.
- Energy consumption.
- Land use interaction.
- Last mile delivery.
- Logistics/distribution.
- Modeling.
- Mobility/Congestion.

Expected Outcomes

- A demonstration of how portering could reduce last mile vehicle impacts (curbside dwell time, driving time, and distance) through a switch to crowd-sourced couriers operating on foot or via bicycle.
- Using combined carrier manifest data, quantify and visualize the collective transport and energy impacts of current parcel carrier activities.
- Through a series of optimization algorithms, demonstrate the potential transport and energy benefits that could be realized if carriers were to share deliveries and collections more equitably among themselves and showcase a series of tools to help visualize those benefits.
- Provide an evaluation of the business models needed to enable carriers to collaborate in this way.

Stakeholder Involvement

The project partners are the University of Southampton, the University of Westminster, University College London, Lancaster University, TNT, Gnewt Cargo, and Transport for London. The project is funded by the UK Engineering and Physical Sciences Research Council (EPSRC) grant EP/N02222X/1 (£1.4m), 1 April 2016 - 31 March 2019.



Attendees at an I-NUF session.
Source: University of Southern California.

INTERNATIONAL URBAN FREIGHT CONFERENCE (I-NUF)

METRANS launched the biennial International Urban Freight Conference (I-NUF) in 2006 to provide a multidisciplinary forum for the emerging field of urban freight and to raise the visibility of urban freight research. I-NUF is recognized as the premier venue for urban freight research. It draws participants representing academia, the private sector, and government from around the world. The 2017 conference was held in October. About 250 participants from 18 countries attended. The conference featured over 100 papers and presentations in the following thematic areas: first and last mile delivery, freight modes, sustainability, best practices, and others (see “Topics Addressed” below). In 2017, the Volvo Research

and Education Foundation (VREF) supported travel scholarships for nine young researchers from developing countries to attend I-NUF to introduce them to cutting edge research and become part of the international urban freight network. I-NUF has become a focal point for urban freight researchers; meetings of Transportation Research Board freight committees and the American Society of Civil Engineers freight committee took place during the conference.

Project Type

Research.

Period of Performance

Every two years; most recently in October 2017.

Project Site

Long Beach, California, USA

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Topics Addressed

- Air quality/environment.
- Curbside delivery and parking.
- Economic competitiveness.
- Energy consumption.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.
- Off-hours delivery.
- Safety.
- Supply chains.

Key Outcomes

The conference disseminates urban freight research from around the world to a global audience. Typically, the best papers are published in a special journal issue; many papers are published individually in refereed journals. Best practice sessions share innovative practices, again from around the world.

Stakeholder Involvement

The conference is organized as a joint venture of researchers, public agency professionals, and industry. All sectors are represented on the conference committee and attendees represent all sectors.



The LIFE ASPIRE logos. Source: MemEx.

LIFE ASPIRE

ASPIRE is an innovative pilot project under the LIFE Program, funded by the European Union (EU) Commission, which is piloting the notion of “credit-based” access into a city center. It is led by the Municipality of Lucca and involves six partners from three different EU Countries (Italy, Croatia, and Sweden) in collaboration with the cities of Stockholm and Zadar. LIFE

ASPIRE defines and implements a “credit-based” access policy allowing flexible road pricing criteria related to the last

mile goods delivery. The main innovation is the implementation of a policy that rewards or penalizes transport operators based on different factors such as vehicle emissions, duration of stay, trip frequency, and the utilisation of time slots or new logistics services. To manage this policy, LIFE ASPIRE will implement in Lucca a Logistics Credit Management Platform (LOCMAP) integrated with two other services (loading/unloading parking lots and cargo-bike sharing) and with the existing access control system dedicated to control commercial vehicles entrance/exit in the limited traffic zone. The replicability and transferability of this “credit-based” access control policy and the related new logistics services will be verified at European levels in collaboration with Stockholm, Sweden—a large city—and Zadar, Croatia—a small town—taking into account their specific contexts.

Project Type

Pilot.

Period of Performance

October 2017 - September 2020.

Project Sites

Lucca, Italy; Stockholm, Sweden; and Zadar, Croatia

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Topics Addressed

- Air quality/environment.
- Curbside delivery and parking.
- Energy consumption.
- Last mile delivery.
- Livability/quality of life.
- Urban access.

Expected Outcomes

The implementation of LIFE ASPIRE will reduce the current level of freight traffic by decreasing the total number of commercial vehicles in last mile delivery operations in the inner historic center of Lucca (and in particular in pedestrian and limited traffic zones). Consequently, it will reduce the current levels of environmental pollution, noise, and vibration due to commercial vehicle emissions. The approach, which is based on “credit access policy,” will be evaluated from its transferability/replicability both at the large city level (Stockholm) and the small town level (Zadar) in order to support the European policy/directive for the Freight Urban Transport (FUT). In particular, the role of Urban Consolidation Center (LuccaPort) will be assessed in this new policy.

Stakeholder Involvement

In order to ensure a proper development of LIFE ASPIRE measures, all relevant stakeholders and target groups will be engaged. The local authorities of Lucca, Zadar, and Stockholm are directly involved in planning measures and demonstration through the Cities and Stakeholder Supporting Forum. A Scientific and Technical Committee has been established, involving university and research institutions, which will directly contribute to the assessment of the innovative approach and measures of LIFE ASPIRE. Local, regional, and national policy makers will be involved, especially for the regulation and research developments and initiatives. Local trade, craftsmen, commerce associations, and transport operators will also be involved in order to collect suggestions and indications for evaluating the LIFE ASPIRE measures after the demonstration phase. Finally, citizens, public transport users, and goods distribution system users will be involved in the demonstration as direct end users of the LIFE ASPIRE services.



Coop and Breytner with electric freight vehicle in Rotterdam. Source: City of Rotterdam.

LIVING LAB CITY LOGISTICS IN THE CITY OF ROTTERDAM

Many cities are grappling with the challenges posed by urban freight logistics. The City of Rotterdam employs a Living Lab approach through its City Logistics Living Lab, which has developed rules and regulations—along with appropriate support mechanisms—in an effort to influence city logistics. The Lab hosts many initiatives. For instance, through the ECOSTARS program, transporters can earn “stars” for sustainable business operations. Businesses are provided information (e.g., on how they can save more fuel) should they implement that program, they are awarded a star. Customers can

quickly and easily see how clean and sustainable a carrier works based on the number of stars they have, providing them positive publicity in addition to realizing fuel cost savings. Other examples of activities in the Rotterdam Living Lab include knowledge exchanges and trials with vehicles. The methodology follows a cyclical approach, where several solutions can be tested and readjusted/improved to fit the changing real-life environment.

Project Types

Policy, Pilot.

Period of Performance

Ongoing.

Project Site

Rotterdam, The Netherlands.

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Topics Addressed

- Air quality/environment.
- Last mile delivery.
- Livability/quality of life.
- Mobility/congestion.
- Modeling.
- Safety.
- Supply chains.

Expected Outcomes

The Living Lab is a continuous process. The city of Rotterdam strives to reach a more livable city with a thriving economy. This means better air quality, less noise, better accessibility, less carbon dioxide emissions, increased spatial quality, etc. Meanwhile, the city helps to engage the innovative process with the private sector. This means trial and error of implementing new logistical concepts and using zero emission freight vehicles.

Stakeholder Involvement

Transport company (front runners and other), representative organizations of the transport sector, research institutes, consultancy, educational facilities, buyers, original equipment manufacturers (OEMs), banks, etc.

METROPOLITAN FREIGHT TRANSPORTATION: IMPLEMENTING EFFECTIVE STRATEGIES

This research project's aim is to develop a tool and associated guidance that catalogues and describes proven solutions to overcome common barriers in urban freight planning. The research team has developed a "problem-driven" Excel matrix of strategies based upon literature and both domestic and international experiences. The Urban Freight Implementation Tool (UFIT), powered by this Excel matrix, provides the user with possible solutions based upon their specific problem.

The primary contributions of the work are:

- 1) The UFIT tool;
- 2) Default weights from experts on factors of importance for implementation;
- 3) Extensive/updated international literature as the foundation; and
- 4) Fact sheets of 30 strategies, including recommendations for implementation.

Pilot studies in Florida, Texas, and Missouri are currently under development to prove how to apply the tool. As the project enters its final stages, a short video highlighting the work and finalized drafts of the deliverables are being developed.

Project Types

Research, Policy.

Period of Performance

May 2016 to May 2018.

Project Sites

Florida, Texas, and Missouri, USA.

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Topics Addressed

- Air quality/environment.
- Building/road design.
- Curbside delivery and parking.
- Economic competitiveness.
- Energy consumption.
- Innovative finance.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.
- Off-hours delivery.
- Safety.
- Supply chains.

Expected Outcomes

Several products will be developed during this effort, including a Strategy Resource Matrix (Excel), UFIT, UFIT User's Guide, and the Documented Pilot Studies to Implement Effective Metropolitan Freight Strategies (for future implementation).

Stakeholder Involvement

Practitioners in the public and private sector were engaged via a survey instrument and a workshop.

NEW APPROACHES TO CREATING COMPATIBILITY BETWEEN FREIGHT MOVEMENTS AND LAND USE

To plan for an environmentally sustainable and livable future, the dynamics between freight and land use must be examined more closely. This project aims to develop guidebooks and decision-making tools for local and regional leaders to help them better understand the interaction between freight and land use on urban areas as a whole. Though freight traffic has grown at a greater rate than passenger vehicle traffic in recent years, traditional research on land use strategies continues to largely ignore freight in lieu of passenger vehicles. However, freight's relationship to land use also has a great impact on our cities; factors such as urban population growth, gentrification, and new supply chain management strategies are also important considerations; and pollution from diesel engines has emerged as a top health concern. Meanwhile, new approaches have been developed in order to create compatibility among freight and other type of land uses, including freight villages, freight hubs, and inland ports. This project will highlight these and other strategies as well as develop methods that will allow cities to quantify and evaluate the impact of land use practice and policies to support efficient movements of all modes of freight. This research project is funded by the National Cooperative Highway Research Program of the Transportation Research Board. The research team is led by the Rensselaer Polytechnic Institute; research partners include SRF Consulting Group, University at Albany-State University of New York, American Transportation Research Institute, and Emprata, LLC.

Project Type

Research.

Period of Performance

April 2018 - April 2019.

Project Sites

The project's end products are intended to be used by decision-makers at the city, regional, and state levels.

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Topics Addressed

- Air quality/environment.
- Energy consumption.
- Land use interaction.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.

Expected Outcomes

The project will result in:

- A guide to quantify and evaluate the impact of land use practices and policies to support efficient movement of all modes of freight.
- Decision-support tools to assist local, regional, and state land use and transportation decision-makers to support efficient movement of freight.

Stakeholder Involvement

Practitioners including land-use planners, local and state officials, and researchers—among others—will be engaged during the research process. The project will take into account the perspectives of a broad variety of affected stakeholders, including land use planners, local and state elected officials, locally appointed officials (planning commissions and board of zoning appeals), remonstrators, constituents, courts, developers, and economic development officials.



The BuyZET logo. Source: ICLEI.

PUBLIC PROCUREMENT'S IMPACT ON TRIP GENERATION

Public procurement's impact on urban transportation patterns is far reaching. Almost every product or service we buy leads to vehicle trips within cities, such as waste collection routes, office supply deliveries, bus services, and road maintenance staff traveling to work sites. BuyZET aims to understand and optimize the impact of public procurement activities on transport patterns in cities and to find innovative and sustainable delivery solutions for goods and services to address these challenges. The BuyZET project is a partnership of cities aiming to achieve zero emission urban delivery of goods and services. To do this, BuyZET partners work

to understand the transportation footprint of their different procurement activities and, in response, develop innovative procurement plans to minimize the number, distance, and disruptiveness of motorized vehicle trips within the city. A second but equally important goal is to maximize the proportion of these trips made by zero emission vehicles.

The three core project cities are Rotterdam, Oslo, and Copenhagen. Southampton, Brussels, Bologna, Jerusalem, Bielefeld, Manchester, and Munich are also participating as observer cities, eventually aiming to implement the project activities as well. The project is coordinated by ICLEI—Local Governments for Sustainability—with the support of Polis and the Netherlands Organization for Applied Scientific Research.

Project Type

Research.

Period of Performance

November 2016 - April 2019.

Project Sites

Rotterdam, The Netherlands; Oslo, Norway; and Copenhagen, Denmark.

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Topics Addressed

- Air quality/environment.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Other: public procurement.

Expected Outcomes

The expected results and impacts, including:

- Creation of a long-lasting European dialogue with cities' suppliers, transport, and service providers.
- Communication of the benefits of identified solutions to a wider audience.
- Development of "buyers groups" to boost the demand for zero emission urban delivery of goods and services.
- Development of new procurement strategies to support the outreach and continuity of the project results.

Key Products:

- New procurement plans for each priority area in each city.
- Methodology for mapping transportation footprint.
- BuyZET Implementation Handbook.
- Input into European Union policy-making and relevant working groups.

Stakeholder Involvement

Key stakeholders are public local authorities. For the selected procurement priority areas, the cities will explore potential innovative procurement solutions. At the end of this process innovative procurement plans will be developed for each procurement area to be implemented by the cities in the coming years.

PUBLIC-PRIVATE PARTNERSHIP TO DEVELOP A NEW GENERATION OF URBAN FREIGHT LEADERS

The United Parcel Service (UPS) partnered with Washington, D.C. DOT (DDOT) and Georgetown University to develop a data-based research exchange program wherein students leverage real-world data from UPS and DDOT to reduce urban congestion, implement new technologies, and enhance quality of life in cities. For example, student projects explored the viability of universal delivery lockers to reduce second delivery attempts, reduce traffic congestion, and consolidate deliveries to a central location. Another student project highlighted potential areas of existing inefficiency within traditional route-planning algorithms, raising important questions about how to deliver in urban environments. As a result of these efforts, the project was named a GovTech and MetroLab Network innovation of the year in 2017.

Project Type

Research.

Period of Performance

Summer 2017.

Project Site

Washington, D.C., USA

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Topics Addressed

- Air quality/environment.
- Building/road design.
- Curbside delivery and parking.
- Economic competitiveness.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.

Key Outcomes

More than 20 students from Georgetown University's Urban Planning and Data Science graduate programs joined forces to research last-mile delivery solutions and congestion mitigation strategies using real world data from UPS and DDOT. The research findings included:

- A commercially viable and financially stable model for city government-managed universal locker delivery.
- Theoretical modeling around how to capture lost delivery efficiency by routing according to neighborhood typology and the built environment rather than just street geography.
- Time studies to show the potential effectiveness of cycle logistic models relative to traditional vehicle delivery modes.
- A low-cost pothole and collision detection data sharing proposal to create a new revenue stream for private carriers while providing better service to city governments.

Stakeholder Involvement

Stakeholders included UPS, DDOT, and Georgetown University. The research effort took place as part of a summer studio class at Georgetown involving Urban Planning and Data Science graduate students.

RESEARCH SUPPORT FOR THE CALIFORNIA SUSTAINABLE FREIGHT ACTION PLAN

In June 2015, California Governor Jerry Brown issued an executive order calling for a “sustainable freight action plan” to be developed and accepted within one year. Several State agencies, including the California Air Resources Board (CARB) and the Department of Transportation (Caltrans), were tasked with developing the plan in collaboration with the freight industry. CARB and Caltrans turned to the academic community for research support. A “Freight Efficiency Group” was formed, with membership representing all of the major segments of the supply chain. Faculty experts from University of California Davis and METRAN Transportation Center (University of Southern California and California State University, Long Beach) were also included. Faculty members worked with industry committees on various topics, wrote white papers, and identified priority strategies for achieving the goals of the plan. The California Sustainable Freight Action Plan (CSFAC) was approved July 2016. METRAN faculty continue to provide research support. Current projects include:

- 1) Assessment of freight efficiency metrics for measuring plan performance;
- 2) Assessment of Caltrans workforce needs in order to manage the various State freight programs;
- 3) Development of economic competitiveness metrics for measuring plan performance; and
- 4) Assessment of industry workforce needs associated with plan implementation.

Project Types

Research, Metropolitan Plans.

Period of Performance

June 2015 - December 2018.

Project Site

California, USA.

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Topics Addressed

- Air quality/environment.
- Economic competitiveness.
- Energy consumption.

Expected Outcomes

The CSFAC is expected to contribute to achieving California’s greenhouse gas reduction goals. Research support is helping State agencies implement the strategies outlined in the CSFAC.

Stakeholder Involvement

This project is entirely stakeholder driven. It includes several State agencies, as well as a wide array of industry segments, including ports, ocean carriers, trucking, rail, agriculture, wholesale, distribution, and retail.

SUCCESS

SUCCESS is one of the few research projects addressing freight transportation for the construction sector with a specific focus on:

- **Construction Supply Chain:** Collecting real data from four pilot construction sites and analyzing them to measure the potential advantages for adopting collaborative tools, decision-support systems, and new practices.
- **Consolidation Centers:** Measuring the potential impact of construction consolidation centers (CCCs) and finding a viable business model.

The aim of SUCCESS is to identify an integrated collaborative approach among all actors of the supply chain and a sustainable business model for CCCs with a focus on replicability across cities and countries. SUCCESS involves analyzing the current situation by collecting data on four pilot sites (in France, Italy, Luxembourg, and Spain) to detect problems and potential improvements to the construction supply chain; identifying solutions and optimisation tools for the supply chain (GIS technologies, process mapping, business models, etc.); establishing numerical scenarios and simulations with and without CCCs for several scenarios to assess potential solutions; testing these different scenarios directly on the pilot sites; and developing a viable business model based on the feedback from the construction sites to ensure the take-up and replicability of the solutions.

Project Types

Research, Policy.

Period of Performance

May 2015 - April 2018.

Project Sites

Luxembourg City, Luxembourg;
Paris, France; Valencia, Spain; and
Verona, Italy.

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Topics Addressed

- Air quality/environment.
- Economic competitiveness.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.
- Off-hours delivery.
- Safety.
- Supply chains.

Expected Outcomes

- For all stakeholders: Tools to identify which best practices can work better in each specific case, using as a lead past performance in similar projects/urban environments in the European Union and the U.S.
- For local administrations: Tools to better understand and communicate the impact of new policy measures, such as consolidation centers, size and class of admitted vehicles, etc.
- For construction and transport/logistics companies: Tools to assess the costs and benefits related to the implementation of CCCs; sustainable business models to address issues in the construction supply chain, focusing on distribution networks, construction sites, and reverse logistics.
- For research organizations: Datasets and tools to model and simulate the impact of several strategies to improve the supply chain of construction activities.

Stakeholder Involvement

Construction companies and local authorities were involved to collect data, which helped researchers develop methodological and technological tools. These stakeholders, including some from 12 non-partner cities in Europe, helped validate the project's findings.

TECH DAY: A METHOD FOR CITIES TO DETERMINE WHICH GOODS DELIVERY TECHNOLOGIES TO PERMIT AND PILOT TEST

The Urban Freight Lab (UFL) developed and applied a new approach that brought retail and delivery firm executives, city officials, and venture capital (VC) firms together for one day to evaluate in real time the public and private benefits of pre-vetted advanced delivery technologies such as sensory devices and robots that can carry packages from trucks into buildings. The event brought together these parties to hear each others' point of view on each proposal, answering very quickly questions such as "Will it fit into the company's business model?" "Will city officials permit on their streets?" and "Will VCs invest in commercializing the technologies?" The first TECH Day, which was conducted in 2017 by the UFL, Seattle DOT (SDOT) and 5 VCs provides a method any city may use to determine which goods delivery technologies to permit and pilot test on city streets.

Project Types

Research, Metropolitan Plans, Policy.

Period of Performance

April 2017 - August 2018.

Project Site

Seattle, Washington, USA.

Contact

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Topics Addressed

- Air quality/environment.
- Building/road design.
- Curbside delivery and parking.
- Economic competitiveness.
- Land use interactions.
- Last mile delivery.
- Livability/quality of life.

Key Outcomes

TECH Day 2017 showed that a real-time evaluation of goods delivery technologies by public officials, private firms, and investors helped all parties understand whether the proposed technologies would meet firms' business needs, be scalable to other major cities (therefore providing sufficient market demand for investors), and provide public benefits for modern cities.

Stakeholder Involvement

Numerous stakeholders contributed to TECH Day's success. Venture capitalists, who hear hundreds of proposals, quickly recognized which tech firms had potential to solve the UFL's goals and had a large market. Members of the UFL (retailers and delivery firms) knew whether or not a business case existed for the tech products. SDOT representatives provided their expert knowledge. The UFL research team pre-vetted the participating technology firms for their ability to solve the Lab's two priority goals: feasibility and scalability.



Merchants Rail Bridge over the Mississippi River.
Source: St. Louis Regional Freightway.

THE ST. LOUIS REGIONAL FREIGHTWAY

The St. Louis Regional Freightway is setting multimodal transportation priorities to optimize the St. Louis region's freight transportation network through public and private partnerships. The St. Louis region's collaborative effort in setting transportation priorities includes industry leaders representing two States, eight counties, over 240 municipalities, and 14,000 manufacturing and logistics companies. The 75-member Freight Development Committee provides an opportunity for the region's supply chain to set infrastructure priorities based on a project's ability to lower transportation costs and optimize the freight network. Project criteria includes economic, multimodal, and efficiency impact,

and safety and security in travel. The project list is a tool for elected leaders, departments of transportation (DOTs) and regional leaders to better understand infrastructure needs of manufacturing and logistics industries representing the nation's supply chain. The list is publicly released during the spring and is available on thefreightway.com. The list was unanimously approved by the region's metropolitan planning organization (MPO) in Fall 2017. Project justifications are used as a tool to facilitate strategic planning for infrastructure investment and funding options. The priority list is included with the Missouri DOT's State Freight Plan and is coordinated with Illinois DOT's Freight Advisory Council.

Project Types

Metropolitan Plan, Pilot.

Period of Performance

April 2016 - April 2019.

Project Sites

St. Louis Metropolitan Area
(Missouri-Illinois), USA

Contact

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Topics Addressed

- Economic competitiveness.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.
- Safety.
- Supply chains.
- Other: Innovative finance.

Expected Outcomes

The Freightway's efforts will inform bi-State, multi-jurisdictional freight planning with the region's supply chain, the DOTs, and the MPO. Additionally, the Freightway will develop and implement a program that collects and assesses data to characterize movements of freight-related shipments within the St. Louis region.

Stakeholder Involvement

Stakeholder involvement includes one-on-one meetings, participating in transportation hearings, generating project letters of support, and hosting public-private panel discussions. The Freightway committee members include manufacturing, logistics, Class I railroads, trucking companies, barge operators, airports, industrial real estate brokers and developers, Illinois DOT, Missouri DOT, and the region's MPO.

UNDERSTANDING BANGLADESHI FREIGHT MOVEMENTS THROUGH DATA AND MODELING

The overall goal of this project is to conduct a freight study to better understand freight activity patterns in Bangladesh using a combination of data collection and modeling. A major component of the work is to develop a national freight demand model to enhance the freight transportation in Bangladesh. The process to develop this model is threefold. First, a survey of establishments across the country to collect freight-related data; second, the data is used to develop and estimate freight generation (FG) and freight trip generation (FTG) models to determine regional and intercity flows; and finally, the conduction of freight origin destination synthesis (FODS) using state-of-the-art models. A second component of the study is the analysis of logistic costs to quantify the effects of congestion and to identify inefficiencies in selected supply chains. This involves global positioning systems (GPS) data collection and activity-based costing to characterize typical supply chains, compute distance- and time-related costs, and development of key performance metrics such as operational costs and reliability. The final aim of this component is to quantify the impacts of congestion on logistic costs.

Project Types

Research, Policy.

Period of Performance

September 2016 - March 2018.

Project Site

Bangladesh.

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Topics Addressed

- Economic competitiveness.
- Logistics/distribution.
- Modeling.
- Supply chains.

Expected Outcome

The final deliverable will be a final report discussing the freight study.

Stakeholder Involvement

The project will seek involvement from private industries, principally receiver and vendor establishments. Private industries will be directly involved in the data collection stages as well as in focus groups and interviews. This is done in collaboration with the World Bank, which commissioned the work.

UPS'S ORION ROUTE NAVIGATION SYSTEM

UPS's On-Road Integrated Optimization and Navigation software, or ORION, is a proprietary system used by the company to reduce miles traveled by 100 million annually. The software optimizes delivery routes with respect to distance, fuel, and time. The software's algorithms learn UPS routes over time and provide drivers real time information about the most logical and efficient routes they should take. Data is collected continuously via onboard data-gathering technology. The software learns and improves routes over time as it learns the particular nuances of a given path such as where and for how long a delivery truck idles. The software was developed over a more than 10 year period beginning in 2003. The final product is currently being implemented across the company.

Project Types

Research, Pilot.

Period of Performance

2013 - Present.

Project Sites

Deployed globally.

Contact

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Topics Addressed

- Air quality/environment.
- Last mile delivery.
- Logistics/distribution.

Key Outcomes

Vastly improved route navigation through innovative data analysis and spatial mapping to optimize routes and reduce miles traveled and costs exponentially. The improved route navigation also has fuel-savings implications: UPS estimates that ORION-optimized routes will save 10 million gallons of fuel annually and reduce its carbon dioxide emissions by 100,000 metric tons. This results in up to \$50 million in annual savings for the company.

Stakeholder Involvement

UPS, academic research and outside experts.



Private freight bays and loading dock in Seattle's Downtown, Uptown, and South Lake Union urban centers.

Source: Urban Freight Lab University of Washington.

URBAN GOODS DELIVERY SYSTEM

To document the comprehensive truck load/unload space network in dense cities, the Urban Freight Lab (UFL) created and conducted a cost-effective method to geospatial-map all private truck load/unload bays and docks in Seattle's Center City area. The UFL developed the methodology and the loading bay dock typology; built a user-friendly app to collect data in the field; and delivered metadata, GIS data files, and documentation of truck-related features of the loading bays and docks to the Seattle Department of Transportation (SDOT). This project is important as there is a high demand for scarce road, curb, and sidewalk space in urban areas with multiple competing uses. Without proven new tools, Seattle and other rapidly growing cities lack a data-driven way to balance limiting and/or reducing parking and loading in street space that is needed for movement of transit, cars, bikes, and trucks. There is a lack of data and information about major cities joining with the private sector to use technology and process improvement tools to purposefully manage both public and private operations of the final 50 feet space.

Project Types

Metropolitan Plan, Pilot.

Period of Performance

September 2016 - June 2017.

Project Site

Seattle, Washington, USA.

Contact

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Topics Addressed

- Building/road design.
- Curbside delivery and parking.
- Economic competitiveness.
- Last mile delivery.
- Livability/quality of life.
- Mobility/congestion.

Key Outcomes

- Eighty-seven percent of buildings in Seattle's downtown, uptown, and S. Lake Union urban centers are completely reliant on goods deliveries from the curb. As applied to date, building codes have resulted in just 13 percent of buildings designed to receive goods off-street.
- GIS-mapping all private truck load/unload spaces is essential in planning a city's comprehensive load/unload space network.

Stakeholder Involvement

SDOT; members of the UFL (Charlie's Produce, Costco Wholesale, Nordstrom, UPS, and USPS); and UFL researchers at the Supply Chain Transportation and Logistics Center, University of Washington.



Urban delivery is most impactful to other modes in the Final 50 Feet. Source: City of Seattle.

USING GOODS DELIVERY NETWORK DATA TO DRIVE POLICY AND URBAN FORM

The Seattle Department of Transportation (SDOT) is using new goods delivery network data to drive policy and urban form. The city's Final 50 Feet Program is using an integrated city-wide approach to operations, land use, and public services. Seattle is developing short-term, high-impact solutions and long-term investment strategies. The Final 50 Feet developed rigorous data-collection protocols that support other city functions such as life safety, land use regulations, and utility services. The program used a proactive approach to benefit multiple city missions. Outcomes will include short- and long-term recommendations for transportation operations, land use regulations, and public service improvements.

Project Types

Research, Policy, Pilot.

Period of Performance

October 2016 - October 2019.

Project Site

Seattle, Washington, USA.

Contact

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Topics Addressed

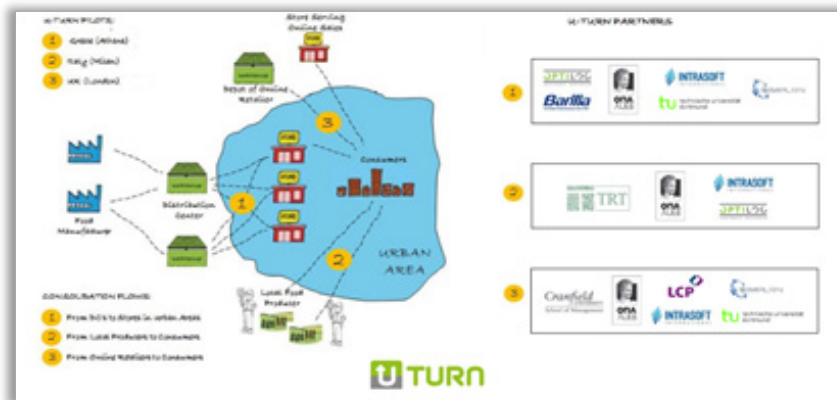
- Building/road design.
- Curbside delivery and parking.
- Economic competitiveness.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Mobility/Congestion.
- Public/private collaboration.
- Safety.
- Supply chains.

Key Outcomes

- Demonstrated a direct connection between transportation and economic vibrancy.
- Confirmed through research the scale and scope of delivery system gaps in Seattle's Center City.
- Engaged city stakeholders to begin problem solving under the Final 50 Feet Program.
- Began developing adaptive solutions to avoid a one-size-fits-all or punitive approach.

Stakeholder Involvement

Public agency (SDOT), higher education (University of Washington's Urban Freight Lab), private industry (UPS, USPS, Nordstrom, Costco, Charlie's Produce), community advocates (business and resident representatives, property management associations).



U-TURN project pilots and partners. Source: Intrasoft International.

U-TURN

The U-TURN project aims to address freight urban distribution, focusing on food logistics.

The project will contribute to our understanding of freight distribution in urban areas, especially addressing the special requirements and needs of food transportation, and will suggest innovative collaboration practices and tools towards achieving more efficient operations from both an environmental and cost perspective.

The project aims to exploit the

opportunities that currently exist for consolidation of three different food transportation flows in urban areas:

a) from food manufacturers/suppliers to the various point-of-sales located in urban areas, given the increasing consumer trend for more frequent shopping in convenient retail stores, b) from local food producers directly to consumers, which is an emerging new trend in big cities, and c) from online food retailers directly to consumers, either through a dedicated depot or from existing stores.

Project Type

Research.

Period of Performance

June 2015 - May 2018.

Project Sites

London, United Kingdom; Milan, Italy; and Athens, Greece.

Contact

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306942200332

Topics Addressed

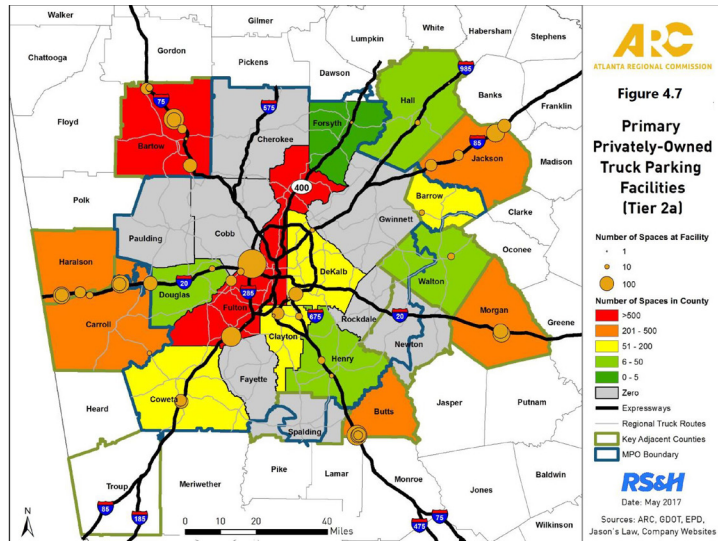
- Last mile delivery.
- Logistics/distribution.

Expected Outcomes

- Pilot implementation of shared logistics practices in fast-moving customer goods (FMCG) settings.
- Pilot implementation of shared logistics practices via the U-TURN platform.
- The implementation of scenarios is tested via simulation for two cases, the retailers, and the third party logistics (3PL) case.
- Addressing culture and immaturity market challenges in the context of agriculture industry and revealing collaboration opportunities.
- Collaboration opportunities in e-commerce sector are explored via generating secondary data and organizing an event with e-commerce industry representatives for collecting insights.

Stakeholder Involvement

Suppliers and retailers in the fast-moving consumer goods sector, 3PL companies, farmers, online grocery retailers.



Truck parking is concentrated in the south and west sides of the Atlanta Region, in addition to locations just outside of the MPO's boundaries.

Source: Atlanta Regional Commission.

quality of life, efficient operations, economic development, and coordinated planning and development. This study was primarily focused on truck parking needs related to Federal hours-of-service requirements and also focused on parking demand for truck staging near industrial facilities. This study resulted in potential recommendations for both infrastructure projects and policies that could be implemented to address truck parking needs across the Atlanta Region. Since the study's completion, ARC has focused on moving towards implementation by working with the public and private sectors. More information can be found on the project's website, atlantaregional.org/truckparking.

Project Type

Metropolitan Plan.

Period of Performance

April 2017 - June 2018.

Project Site

Atlanta, Georgia, USA.

Contact

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Topics Addressed

- Other: Regional Truck Parking.

Key Outcomes

Recommendations focus on the following strategies:

- Add/expand truck parking supply
- Develop truck parking policies
- Develop truck parking partnerships
- Improve sharing of truck parking information
- Monitor/integrate future technology

Expanding the truck parking supply is the most important and most difficult of these strategies but is challenging due to zoning, land costs, and NIMBYism. With the study complete and the focus now on adding parking, the second most populous county in the State has begun a truck parking study focused on implementation while other local jurisdictions have expressed interest in updating their zoning code related to parking. Staff from TSPS, a truck parking company, have also presented at a regional transportation meeting and conducted individual meetings with local governments and Community Improvement Districts (CIDs).

Stakeholder Involvement

ARC used stakeholder interviews, a survey, and its Freight Advisory Task Force to engage with Georgia DOT, FHWA, local government transportation/land use planners, CIDs, and the private sector. ARC had a separate survey to gather input from truck drivers about parking issues in their region.

ATLANTA TRUCK PARKING STUDY

The Atlanta Regional Commission (ARC), along with a consultant team led by RS&H, conducted the Atlanta Regional Truck Parking Assessment Study for the 20-county Atlanta region. This study was a recommendation from the 2016 Atlanta Regional Freight Mobility Plan Update based on information gathered about truck parking demand from local, regional, and Federal sources. During that planning process, many cities and counties in the Atlanta Region identified truck parking as an issue in their jurisdiction. The purpose of this study was to identify ways to help facilitate development of a well-planned regional truck parking network that meets existing and future truck parking needs. Goals for this plan emphasize safety,



The dedicated freight corridor connecting the Port of Boston to I-93 opened in 2017. Source: Massachusetts Port Authority.

BOSTON'S DEDICATED FREIGHT CORRIDOR

Boston's Conley Terminal is located in historic South Boston, adjacent to a dense urban neighborhood. The terminal is not served by rail, but does have nearby access to Interstates 90 and 93. The terminal produces more than 900 truck trips per day, which were generating noise, vibration, and congestion impacts on area residents and local city streets. To address this, the Massachusetts Port Authority (MassPort) planned, acquired land, and constructed the Thomas J. Butler Freight Corridor and Memorial

Park, a dedicated freight roadway to remove container traffic from neighborhood streets. The new Freight Corridor has removed all Conley container trucks from East First Street and Summer Street in South Boston. The Freight Corridor expanded on-terminal truck queuing areas, resolving community concerns over trucks queuing and idling near residences. The new roadway alignment also facilitates future plans to relocate the terminal's main gate facility and creating a spine for the terminal's underground electrical and telecommunications infrastructure. The project includes a 4.5-acre landscaped buffer park along East First Street. The park features a multi-use path, dog park, and interpretive panels as well as a 16-foot-tall noise wall that separates the park and the neighborhood from the trucking and container terminal activities to the north.

Project Type

Metropolitan Plan.

Period of Performance

Ongoing since Fall 2017.

Project Site

Boston, Massachusetts, USA.

Contacts

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Topics Addressed

- Air quality/environment.
- Building/road design.
- Economic development.
- Land use interactions.
- Last mile delivery.
- Livability/quality of life.
- Safety.

Key Outcomes

- The freight corridor removed all Conley container trucks from local streets (East First Street and a portion of Summer Street) to a new, dedicated route.
- Adds a state-of-the-art security facility, which will increase the safety of port operations.
- Adds much needed green space with the 4.5 acre Thomas Butler Memorial park, which includes lighted paths for pedestrians and runners, bike racks, and a new enclosed dog park.
- Separates the residential neighborhood and the container terminal with a noise wall.
- Adds 95 on-street parking spaces along East First Street.

Stakeholder Involvement

A design advisory committee of local residents and elected officials collaborated with MassPort and its consultant design team over approximately 18 months to arrive at the design for the Butler Memorial Park. MassPort also consulted municipal, State, and Federal agencies during the project planning.



Portion of Downtown Seattle as seen from the perspective of ease or difficulty when engaging in goods movement. Source: SDOT.

CITY OF SEATTLE'S FINAL 50 FEET PROGRAM

The Final 50 Feet program identified a new area of logistics study around the final 50 feet of a goods delivery trip and seeks to optimize the most time-intensive and costly portion of goods movement in urban areas. This program's research established and quantified links between building operations and impacts to goods movement. Proof-of-concept pilot studies are updating the city's understanding of the fast-changing urban goods delivery landscape as well as providing detailed curb space use at archetypical buildings. The information generated is generating a literal landscape for goods movement to help better understand needs in densely developed environments.

Project Types

Research, Metropolitan Plans, Policy, Pilot.

Period of Performance

October 2016 - present.

Project Sites

Seattle, Washington, USA.

Contact

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Topics Addressed

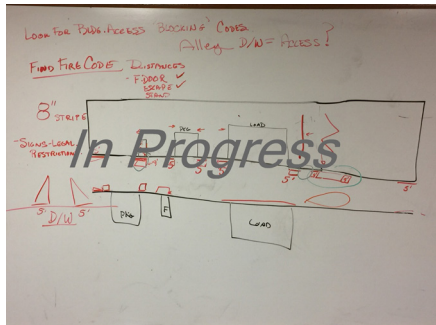
- Building/road design.
- Curbside delivery.
- Land use interaction.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.
- Off-hours delivery.
- Safety.
- Supply chains.
- Other: equity.

Expected Outcomes

The program is evolving from foundational research and data collection to pilot project review and research. The ongoing relationship with the University of Washington's Urban Freight Lab is also maturing into an informational network made of private companies interested in logistics, other government agencies, and academic institutions. As such, the program continues to generate new information as well as good will in professional and academic circles. As an example, Seattle DOT's (SDOT) work has generated the first known building-by-building map showing the relative ease of access for goods movement.

Stakeholder Involvement

SDOT and University of Washington continue to collaborate and create a truly original dataset that allows a new type of analysis on the urban environment by combining public and private entity expertise with academic research.



Seattle is seeking to update building codes to maximize loading bay utility. Source: Seattle DOT.

CITY OF SEATTLE'S FUTURE 50: ALLEY CONGESTION STATEMENT OF LEGISLATIVE INTENT

The Alley's Statement of Legislative Intent report submitted to the Seattle City Council in July 2018 committed city staff to coordinate representatives of Seattle's DOT, Department of Construction and Inspections, Department of Planning and Community Development, and public utilities to examine standards for adequate loading facilities for future developments. The intent is to ensure that private development accommodates load/unload/service needs within its own site to conserve public rights-of-way for mobility.

Project Types

Policy, Metropolitan Plans.

Period of Performance

January 2019 - present.

Project Site

Seattle, Washington, USA.

Contact

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(206) 684-4524

Topics Addressed

- Building/road design.
- Curbside delivery.
- Economic development.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Safety.

Expected Outcomes

As the *Future 50* implies, Seattle recognizes that managing building functionality requires looking decades into the future. Currently, recommendations have been submitted to Council and Division Directors. Business rules for interdepartmental support are being developed ahead of any new building design requirements, seeking to improve loading bay functionality for all affected services.

Stakeholder Involvement

The Seattle City Council and Seattle's Departments of Transportation, Construction and Inspections, Planning and Community Development, and Public Utilities are engaged in developing the problem statement, analysis, and code updates.

CLOSER: A PLATFORM FOR COLLABORATION

CLOSER is a Swedish professional network which provides transportation practitioners opportunities to work together and share ideas, insights, and challenges for increased transport efficiency. CLOSER is a network made up of about 45 partners from industry, academia, and general society who together form a consortium of freight practitioners working on joint projects in strategic working groups. The platform is staffed by the CLOSER Secretariat, which consists of about 10 people who work to encourage collaboration among members of the platform, both in project initiation and in running working groups around specific themes. The results of the network are new solutions for the freight transport system needed to build a sustainable society.

Project Type

Pilot.

Period of Performance

June 2012 - ongoing.

Project Site

Gothenburg, Sweden.

Contact

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Topics Addressed

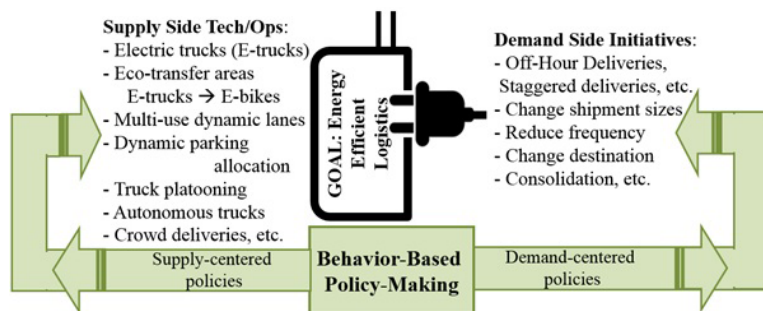
- Air quality/environment.
- Curbside delivery.
- Economic competitiveness.
- Energy consumption.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Safety.
- Supply chains.

Expected Outcomes

CLOSER runs regular roundtable meetings focused on specific themes. Urban mobility with a focus on freight is just one of several topic groups. The platform also initiates and coordinates a large number of multi-stakeholder projects with the overall aim increased transport efficiency.

Stakeholder Involvement

Around 45 partners from industry (original equipment manufacturers, transport companies, transport buyers, etc.), society (cities, regions, authorities), and academia (institutes and universities in Sweden).



Energy-Efficient Logistics diagram. Source: Rensselaer Polytechnic University.

COLLABORATIVE APPROACHES TO FOSTER ENERGY-EFFICIENT LOGISTICS

The goal of the project is to foster the adoption of Energy Efficient Logistics (EEL) along the supply chains operating in the Albany-New York City (NYC)

corridor in a way that benefits the range of stakeholders and agents involved in, and affected by, those supply chains. The project aims to fully exploit the potential of collaborative approach between the carriers, shippers, and receivers. The strategy is to induce carriers to adopt energy efficient Technologies and Operations (Tech/Ops), and induce shippers and receivers to change their demand patterns to exploit the synergies with Tech/Ops and achieve EELs. A selected group of EEL initiatives will be pilot-tested in the Albany-NYC corridor, which is the project's living lab, to gain insight into the barriers and obstacles for EELs, identify ways to overcome those barriers, and demonstrate the real-life power of EEL initiatives to stakeholders.

Project Types

Research, Policy, Pilot.

Period of Performance

October 2017 - September 2020.

Project Site

Corridor between Albany, New York and New York City, New York, USA.

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Topics Addressed

- Air quality/environment.
- Economic competitiveness.
- Energy consumption.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.
- Supply chains.

Expected Outcomes

The key outcomes of the project will be an energy management guidebook with actionable information and a practice-ready approach to foster EEL initiatives at the city, Metropolitan Planning Organization (MPO), and State levels and a comprehensive set of analytical tools to enable professionals to assess how policy measures will influence the behavior of the supply chain participants and their demand patterns and, ultimately, freight energy use.

Stakeholder Involvement

The project has an Industry Advisory Group (IAG) and an Agency Advisory Group (AAG). These groups provide guidance to the team and will collaborate in outreach. Some key members of the IAG and AAG are Price Chopper, GE Global Research, the Capital District Transportation Authority, and the Albany Port District Commission.

DATA-DRIVEN DESIGN OF LAST MILE URBAN LOGISTICS SOLUTIONS TO ADDRESS E-COMMERCE GROWTH

Online shopping and associated e-commerce growth are inevitable. Changes in consumer behavior will impact the way goods are moved through supply chains, particularly in an urban context. This project has two main objectives. First, to collect data that allows the team to understand and model e-commerce derived freight flows. Primary data is being collected through household surveys, and secondary data is being collected via partnerships with companies providing e-commerce delivery services. Second, it aims to propose and test a modeling and simulation framework that allows the team to replicate e-commerce flows, and assess changes in status quo through demand management techniques and associated mobility system impacts.

Project Types

Research, Policy.

Period of Performance

June 2018 - June 2020.

Project Site

Singapore, Singapore.

Contact

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Topics Addressed

- Land use interactions.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.
- Supply chains.

Expected Outcomes

The project will develop insights into: (a) methods to collect data and derive behavioral models and simulate e-commerce freight vehicle flows; and (b) impact of demand management strategies for future growth scenarios.

Stakeholder Involvement

Research team: Singapore University of Technology and Design, Massachusetts Institute of Technology (MIT), Singapore-MIT Alliance for Research and Technology; partner government agencies: Urban Redevelopment Authority, Land Transport Authority, JTC Corporation. All agencies provide key inputs into the policies being analyzed throughout the study as well as support for the data collection efforts.



An instant delivery courier operating in Paris. Source: IFSTTAR University of Paris-East.

DEVELOPMENT OF A DIGITAL PLATFORM TO BETTER FACILITATE ON-DEMAND DELIVERY

This research focuses on “instant deliveries,” defined as those deliveries occurring within two hours or less after order. This is usually done with the aid of a digital platform connecting shippers, couriers, and customers. The team is collecting data on courier activities related to instant delivery platforms in use in several major cities around the world, though interviews and surveys are completed in Paris. Though consumer demand is growing for instant deliveries, the instant delivery companies’ business models are not yet stabilized, and many of them depend on investors to be able to develop. It is a highly competitive market that brings traffic and urban planning impacts to city governments.

Project Type

Research.

Period of Performance

December 2016 - present.

Project Sites

Paris, France; and other large cities around the world.

Contact

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Topics Addressed

- Economic competitiveness.
- Livability/quality of life.
- Mobility/congestion.
- Modeling.
- Safety.

Expected Outcomes

The results of this study are ongoing, and a few scholarly articles and a research report have already been published. Self-employed instant delivery couriers represent thousands of new delivery jobs in cities.

Stakeholder Involvement

VREF and IFSTTAR have partnered to carry out this effort.

EFFECTIVE DECISION-MAKING METHODS FOR FREIGHT-EFFICIENT LAND USE

The main goal of this project is to design procedures and analytical techniques that help land use planners and policymakers implement freight-efficient land use policies. Freight-Efficient Land Uses (FELUs) are defined as the land use patterns that minimize the private and external costs, i.e., social costs, associated with the economic activities that consume and produce goods at all stages of production and consumption, including reverse and waste logistics. Furthermore, freight activity is pervasive as it takes place in the entire metropolitan area, not only at the most visible generators such as intermodal terminals, large manufacturing sites, and commercial centers. The project aims to study freight activities of all sectors and the location choice of the establishments to understand their dynamics. Decision-support tools will be developed to assess the impact of land use policies on land use and freight activities.

Project Type

Research.

Period of Performance

April 2017 - December 2019.

Project Sites

Guidebook is written in an American-based context.

Contact

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Troy, New York
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(518) 276-6221

Topics Addressed

- Air quality/environment.
- Economic competitiveness.
- Energy consumption.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Supply chains.

Expected Outcomes

The project will result in:

- A guide to quantify and evaluate the impact of land use practices and policies to support efficient movement of all modes of freight; and
- Decision-support tools to assist local, regional, and state land-use and transportation decision-makers to support efficient movement of freight.

Stakeholder Involvement

The stakeholders include land use planners, local and State elected officials, locally appointed officials (planning commissions and board of zoning appeals), remonstrators, constituents, courts, developers, and economic development officials. Practitioners engaged during the research process include land use planners, local and State officials, and researchers, among others.

Freight and Service Activity Generation (FSAG) Software
<https://coe-sufs.org/wordpress/software/>

CONTACT:
 Jeffrey Wojtowicz
 Rensselaer Polytechnic Institute
 wojtoj@rpi.edu

STEPS TO ACCESS SOFTWARE:

- 1 Request account by email
- 2 Administrator provides user account & password
- 3 Access webpage & try out the software!

- Produces freight and service activity estimates at state, city, county, ZIP Code and establishment level for the entire United States
- Uses the latest models developed by Rensselaer Polytechnic Institute, documented in *NCFRP Report 37: Using Commodity Flow Survey Microdata to Estimate the Generation of Freight, Freight Trip Generation, and Service Trips*.
- Estimates at a 2-digit level NAICS:
 - Daily freight deliveries and shipments,
 - Service trips attracted, and
 - Freight attracted and produced
- Estimates at a 2- and 3-digit NAICS:
 - Freight produced at a ZIP code level
- Types of account:
 - **FREE version** enables the user to run 100 models and access estimates for 2-digit level NAICS.
 - **FULL version** includes unlimited runs and all available models for 2- and 3-digit level NAICS, and access to a growing number of international models.
- Visit <https://coe-sufs.org/wordpress/software> to learn more.

FSAG Software advertisement flyer. Source: Rensselaer Polytechnic University.

FREIGHT AND SERVICE ACTIVITY GENERATION SOFTWARE

The Freight and Service Activity Generation (FSAG) Software is designed to produce estimates of freight and service activities at the establishment and ZIP code level for the entire United States. It uses the latest models developed by Rensselaer Polytechnic Institute (RPI) available at “National Cooperative Freight Research

Program (NCHRP) Report 37: Using Commodity Flow Survey Microdata to Estimate the Generation of Freight, Freight Trip Generation, and Service Trips” (Holguín-Veras et al., 2017). At a 2-digit level North American Industry Classification System (NAICS), the software is able to estimate daily freight deliveries and shipments, service trips attracted and freight generated at an individual establishment level and at a ZIP code, City, Metropolitan Statistical Area, and State level. In addition, it is able to estimate the amount of freight produced (in pounds per year) for 2-digit and 3-digit NAICS.

Project Type

Pilot.

Period of Performance

January 2015 - January 2019.

Project Sites

Online.

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Topics Addressed

- Curbside delivery.
- Economic competitiveness.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.
- Supply chains.

Key Outcomes

The final deliverable is the software itself and it is already developed and available online. The functionalities have been improved to provide estimates at different geographical areas (ZIP code, county, city, and State).

Stakeholder Involvement

The stakeholders, such as consultants and public sector planners, were given free accounts for the demo version. Estimates from the software have been used to facilitate policy-making for NYCDOT. All stakeholders involved have provided important feedback that has been applied to the software.



Vans are the biggest growth mode in London related to the growth in the service sector and e-commerce. Source: University of Southampton.

supplied by different carriers; c) use the data with a series of optimization algorithms to investigate the potential transport and energy benefits if carriers were to share deliveries and collections more equitably between them and develop tools to help visualize those benefits; and d) evaluate what business models would be needed to enable carriers to collaborate in this way.

FREIGHT TRAFFIC CONTROL 2050

“Freight Traffic Control 2050: transforming the energy demands of last-mile urban freight through collaborative logistics” (£1.4m) is looking at the transport and energy benefits that can be gained from the collaborative scheduling of parcel carrier rounds in London. The project involves the Business School along with University of Lancaster, University of Westminster, and University College London. Key objectives are to: a) investigate the collective transport and energy impacts of current parcel carrier activities; b) create a database to gather and interrogate collection and delivery schedules

Project Types

Policy, Pilot.

Period of Performance

April 2016 - August 2019.

Project Site

London, United Kingdom.

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Topics Addressed

- Air quality/environment.
- Curbside delivery.
- Energy consumption.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.

Expected Outcomes

- Demonstrating a portering (walking courier) operation in central London in which van drivers hand goods to porters for final delivery on foot (with scope for future use with autonomous vehicles and drones).
- Developing new vehicle routing and scheduling optimization solutions that take account of driving and walking components over the last mile.
- Understanding business-as-usual delivery operations (including driving and walking operations and vehicle stopping times) for last mile parcel operations.
- Demonstrating new ways to visualize and quantify the collective impacts of multi-parcel carrier operations across London to aid freight planning.

Stakeholder Involvement

TNT, Transport for London, and Gnewt Cargo were engaged in the project from the outset.

FREIGHT TRAFFIC COUNT DATA PROGRAM

The City of Seattle's Freight Program is conducting a cordon-line approach to measure volumes and classifications on major routes serving the greater downtown area in anticipation of the January 2019 Permanent Viaduct Closure (PVC). The project will also establish a baseline to measure efficacy for future downtown mobility and congestion pricing initiatives.

Project Types

Research, Metropolitan Plans.

Period of Performance

October 2018 - present.

Project Site

Seattle, Washington, USA.

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Topics Addressed

- Air quality/environment.
- Building/road design.
- Economic competitiveness.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Mobility/congestion.
- Modeling.
- Supply chains.

Expected Outcomes

This program will provide baseline data to inform the Freight Program and better understand the various uses of trucks, including construction, package delivery, service vehicle, and both dry and perishable bulk deliveries. Desired outcomes are to better understand the large vehicle volume and mix required to sustain a vibrant urban center. The project is ongoing, and efforts to collect data outside the downtown core will be completed over an approximately 3-year cycle.

Stakeholder Involvement

The University of Washington Urban Freight Lab is reviewing and evaluating data. Seattle DOT is collecting data via permanent and portable video.

IDENTIFYING FREIGHT VEHICLES THAT BETTER PRESERVE BRAZIL'S HISTORIC CITIES

Brazilian historic cities face the challenge of developing urban mobility projects, matching the preservation of cultural heritage, and maintaining the original characteristics with the flow of vehicles. The intense flow of vehicles in these cities has impacts for the preservation of historical heritage as well as for the urban goods distribution necessary for the maintenance of economic activities in these cities. These impacts are more noticeable in the historical centers where there is a predominance of commercial and administrative activities. A possible solution to contain such impacts, particularly those related to freight transportation, is to investigate different forms of urban delivery to reduce the externalities of the activity. Therefore, the main objective of the project is to identify the relevant factors in the implementation of a urban delivery center (UDC) to serve Brazilian historical cities.

Project Types

Research, Policy.

Period of Performance

January 2018 - January 2020.

Project Sites

5 sites in Brazil (Ouro Preto, Diamantina, Serro, Tiradentes, Sao Joao del Rey)

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Topics Addressed

- Curbside delivery.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.

Expected Outcomes

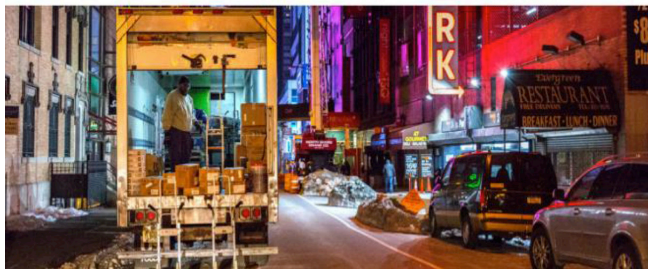
Guidelines to historical cities in order to provide knowledge about urban freight transport in historical places.

Stakeholder Involvement

Retailers and universities.



Home Benefits Noise Management Toolkit Get Involved



Screenshot of OHD Website (www.ohdnyc.com).
Source: New York City DOT.

NEW YORK CITY OFF-HOUR DELIVERIES PROGRAM

Due to the success of the pilot program, NYCDOT is now seeking additional transporters and receivers to rethink their delivery schedule and shift to off-hour deliveries (OHDs). The OHD program is intended to increase the number of deliveries between 7:00 p.m. and 6:00 a.m. within NYC, specifically Midtown and Lower Manhattan and the downtown areas of Brooklyn, Flushing, and Jamaica where there are high pedestrian volumes

and limited curb space. DOT has made critical steps to expand the program including—but not limited to—the development of an OHD program brand and marketing strategy, a dedicated program website, tailored program implementation guides for receivers and transporters, and noise mitigation. DOT also developed an OHD Recognition Program to foster behavior change by publicly spotlighting companies engaged in OHD best practices.

Project Types

Policy, Pilot.

Period of Performance

Ongoing since Spring 2019.

Project Site

New York City, New York, USA.

Contact

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DPeters@dot.nyc.gov
(212) 839-7704

Topics Addressed

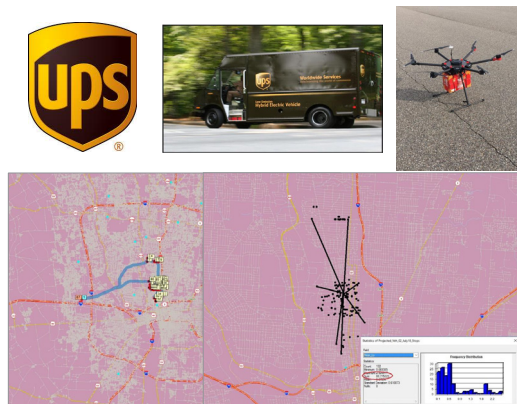
- Air quality/environment.
- Curbside delivery.
- Last mile delivery.
- Off-hours delivery.
- Safety.

Expected Outcomes

Expand the OHD program to 900 new food and non-food retail locations in targeted areas throughout NYC. This is expected to reduce truck traffic and congestion at peak hours, improve business operations, and improve air quality in the city.

Stakeholder Involvement

NYCDOT Office of Freight Mobility engages the trucking industry at large, supply chain managers, transporters, and receivers in key industries (food and non-food retail). These companies also have vertically integrated supply chains, making it easier to implement OHD into their operations.



Source: Oak Ridge National Laboratory.

OPTIMIZATION OF INTRA-CITY FREIGHT MOVEMENT WITH NEW DELIVERY METHODS

The purpose of this study is to develop a methodology for modeling intra-city freight delivery tours using innovative modes and alternative last mile delivery scenarios to determine potential energy savings in Columbus, Ohio. This study is part of the Department of Energy (DOE)'s SMART (Systems and Modeling for Accelerated Research in Transportation) Mobility Multi-Modal Freight Pillar. It is a partnership with the Oak Ridge National Laboratory, Idaho National Laboratory, National Renewable Energy Laboratory, United Parcel Service – Columbus, Ohio, and the Mid-Ohio Regional Planning Commission.

Project Type

Research.

Period of Performance

May 2017 - May 2018.

Project Site

Columbus, Ohio, USA.

Contact

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Topics Addressed

- Curbside delivery.
- Energy consumption.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.

Expected Outcomes

Initial findings from the study suggest that fully electric vehicle (EV) Class 6 delivery trucks appear to be helpful in reducing energy usage in the portion of the tour from the depot to the neighborhood (“stem” portion). This also suggests significant savings for vehicles traveling further from a depot before arriving at destinations. Parcel lockers were also found to be helpful in reducing energy usage in suburban neighborhoods and areas with fewer through-streets and more cul-de-sacs (less connectivity). Lastly, the findings suggest that pairing parcel lockers with EV Class 6 delivery trucks or EV vans will likely further reduce overall freight delivery energy use.

Stakeholder Involvement

This study was funded by the DOE and was a joint effort with the Oak Ridge National Laboratory (lead), Idaho National Laboratory, and the National Renewable Energy Laboratory. The United Parcel Service in Columbus, Ohio, and the Mid-Ohio Regional Planning Commission provided data for the study.



SEATTLE FOOD RESCUE PROGRAM

Seattle Public Utilities (SPU) is recruiting freight participation in its Food Rescue Program, which diverts unnecessary disposal of food out of the waste stream and redirects food to support meal programs. One of its charges is to take advantage of food delivery systems to “reverse

capture” food while keeping it fresh and secure. The freight program is helping SPU connect to the University of Washington’s Urban Freight Lab (UFL) partners to engage in food rescue research and development and to provide delivery transportation insights to rescue initiatives.

Food Rescue has many components. Seattle and the Urban Freight Lab are working to map their logistic interactions and needs. Source: Seattle DOT.

Project Type

Research.

Period of Performance

March 2019 - December 2019.

Project Site

Seattle, Washington, USA.

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Topics Addressed

- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Supply chains.
- Other: equity.

Expected Outcomes

SPU is creating a Food Rescue Innovation lab with a framework similar to the UFL with the intent to facilitate information exchange and expand food rescue coordination. SDOT and University of Washington’s UFL will apply expertise to map the multiple supply chains to support a benefits case review and identify inefficiencies and overlap.

Stakeholder Involvement

Seattle Public Utilities is convening Food Rescue Lab meetings; SDOT and University of Washington UFL are mapping and evaluating supply chains.

SINGAPORE URBAN FREIGHT AND HEAVY VEHICLE STUDY

Urban freight movements are associated with a series of negative externalities (congestion, safety, pollution, etc.). This project takes a holistic view to characterize and derive insights on how to minimize externalities. Research objectives: (a) Data Collection: the research team applies the behavioral laboratory Future Mobility Sensing (FMS) to collect data on (i) establishments' characteristics and shipment flows; and (ii) heavy vehicles routes, parking locations, stop details, and truck driver preferences. Data collection methods include GPS tracking of freight vehicles and shipments, and surveys on truck drivers and establishments; (b) Modeling and Analysis: Collected data is used for freight behavioral model development and subsequent integration with the SimMobility simulation laboratory, an agent-based model of passenger and freight transportation suitable to assess urban freight services/policies and their impacts; (C) Decision and Policy-Making: the research team demonstrates the potential of simulation to inform the design and evaluation of policies related to traffic management, land, and freight infrastructure planning.

Project Types

Research, Policy.

Period of Performance

May 2016 - present.

Project Site

Singapore, Singapore.

Contact

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Topics Addressed

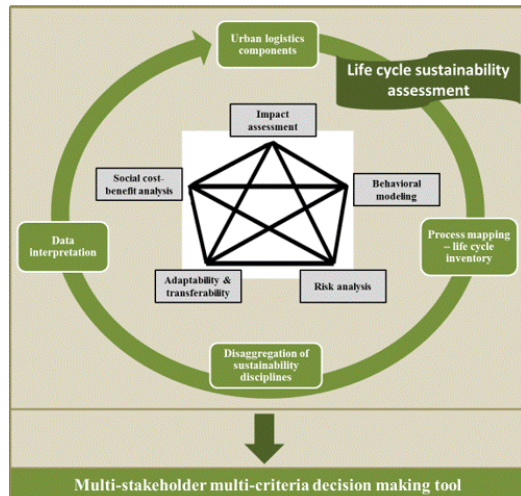
- Curbside delivery.
- Land use interaction.
- Last mile delivery.
- Logistics/distribution.
- Mobility/congestion.
- Modeling.
- Off-hours delivery.

Expected Outcomes

At its completion, this study expects to contribute to freight survey methods knowledge base, develop behavioral model formulations, and make local freight policy recommendations.

Stakeholder Involvement

Research team: Singapore University of Technology and Design, Massachusetts Institute of Technology (MIT), Singapore-MIT Alliance for Research and Technology; partner government agencies: Urban Redevelopment Authority, Land Transport Authority, JTC Corporation. All agencies provide key inputs into the policies being analyzed throughout the study as well as support for the data collection efforts.



EVALOG multifaceted approach for smart city logistics evaluation. Source: University of Thessaly.

each impact area and a global Logistics Sustainability Index for each tested solution per stakeholder category and city case. More specific analyses are performed, which may be also selected by a city; social cost-benefit, adaptability-transferability; and risk and behavioral modeling.

Project Types

Research, Policy, Pilot.

Period of Performance

June 2015 - May 2018.

Project Sites

London, United Kingdom;
Gothenburg, Sweden; Athens,
Greece; Graz, Austria; Mechelen,
Belgium; Turin, Italy; Bologna, Italy;
Venice, Italy; Reggio Emilia, Italy;
Barcelona, Spain; Rome, Italy; and
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SMART CITY LOGISTICS

The objective of the study was to assess the performance of smart urban logistics solutions, policies, and techniques designed specifically for addressing the impacts of last mile operations in a city. For this reason, a common evaluation platform, EVALOG, was developed. The platform enables both ex-ante and ex-post evaluation, allows consideration of multifaceted assessment parameters, provides transparent representation and interpretation of the impacts, and facilitates stakeholder discussion and mutual decision-making. The analysis embeds life cycle sustainability assessment techniques, and each solution may be studied from its creation to its operation, maintenance, and closure. A hierarchical order is used to allocate relevant importance to the main sustainability disciplines (economy and energy, environment, transport and mobility, society) and enablers (policy and measure maturity, social acceptance, user uptake), broken furthermore to criteria and indicators. EVALOG calculates performance indices for

Topics Addressed

- Air quality/environment.
- Economic competitiveness.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Mobility/congestion.
- Modeling.
- Off-hours delivery.
- Safety.

Key Outcomes

EVALOG was used for assessing smart urban logistics solutions in 12 European cities within the context of the H2020 European research project, NOVELOG. The solutions covered both regulatory/incentive driven policies and cooperative schemes for micro consolidation and delivery, shared transportation network and vehicle capacity, and freight transportation planning. The comparative evaluation results indicated that logistics performance improved in all city cases. Higher improvement was observed by the wider public, followed by public authorities and supply chain providers. Better performing solutions were “access by load factor,” followed by “multimodality,” “ITS for routing,” and “smart lockers.” The results are city-oriented and depict equally all stakeholders’ objectives and priorities.

Stakeholder Involvement

City stakeholders were the main participants in this study. They covered public authorities, supply chain stakeholders, and the general public represented by relevant associations. All participants were involved partners in NOVELOG, which aimed at evaluating solutions tested in the cities. They provided data and opinions throughout the evaluation.



Smart Truck Management Plan logo.
Source: New York City DOT.

SMART TRUCK MANAGEMENT PLAN

This is NYCDOT's comprehensive blueprint to improve the efficiency of truck deliveries across the five boroughs and to reduce the environmental and community impacts of trucking. This project is a key initiative of the agency's 2016 Strategic Plan (See Freight Initiatives: <https://www.nycdotplan.nyc/freight-movement>).

Project Type

Policy.

Period of Performance

Winter 2016 - Spring 2019.

Project Site

New York City, New York, USA.

Contact

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(212) 839-7704

Topics Addressed

- Air quality/environment.
- Curbside delivery.
- Economic competitiveness.
- Land use interactions.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Off-hours delivery.
- Safety.

Expected Outcomes

The plan will provide recommendations on updates to truck routes, reforms to truck rules, strategies to improve compliance, and a specific truck freight plan for each of the five boroughs. It is scheduled for release in Spring 2019 and is currently in the process of incorporating stakeholder feedback.

Stakeholder Involvement

NYCDOT convened a freight advisory group in December 2016 that brought together the trucking industry, businesses, researchers, advocacy groups, and government agencies. The purpose of the group was to examine curb management, sustainability, compliance, enforcement, and land use policies related to truck freight. DOT also solicited input from the communities most directly impacted by truck traffic through a series of 11 community open houses.

TEXAS FREIGHT MOBILITY PLAN

The Texas Freight Mobility Plan provides the state with a blueprint for facilitating continued economic growth through a comprehensive, multimodal strategy for addressing freight transportation needs and moving goods efficiently and safely throughout the State. The plan also meets all Federal requirements in the Fixing America's Surface Transportation (FAST) Act of 2015. The purposes of the freight plan are identifying multimodal challenges, policies, programs, investment strategies, and data needed to enhance freight mobility; to provide efficient, reliable and safe freight transportation; and to improve the State's economic competitiveness. The goals of the freight plan are to improve multimodal freight transportation safety; improve the contribution of the Texas freight transportation system to enhance economic competitiveness, productivity and development; to maintain and preserve freight infrastructure assets using cost-beneficial treatment; to reduce congestion and improve freight system efficiency and performance; to provide transportation choices and improve system connectivity for all freight modes; to manage environmental and the Texas Department of Transportation (TxDOT) resources responsibly and be accountable in decision-making; to understand and incorporate citizen feedback in decision-making processes and be transparent in all TxDOT communications; and to identify sustainable funding sources for all freight modes.

Project Types

Metropolitan Plans, Policy.

Period of Performance

May 2016 - November 2017.

Project Sites

Texas (Statewide), USA.

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Topics Addressed

- Building/road design.
- Economic competitiveness.
- Energy consumption.
- Innovative finance.
- Land use interaction.
- Logistics/distribution.
- Mobility/congestion.
- Safety.
- Supply chains.

Expected Outcomes

By 2045, congestion and truck tonnage are projected to increase significantly on Texas interstates, particularly those located in the Texas Triangle (encompassing Dallas-Fort Worth, San Antonio, Austin, and Houston). The Texas Freight Mobility Plan provides an understanding of transportation needs and challenges that were identified by assessing existing conditions, projecting future needs based on forecasts of freight movement in 2045, and extensive stakeholder input. Outcomes include projects, policies, and programs to address congestion and freight mobility in urban areas, system operations, safety, asset preservation, rural connectivity, multimodal connectivity, international border crossings, public awareness/education, and funding.

Stakeholder Involvement

Extensive stakeholder involvement was led by the Texas Freight Advisory Committee, which approved the plan before approval by TxDOT Administration. Plan development was supplemented by 22 workshops held around the state along with several webinars, an online survey, and newsletters.



UPS is piloting a modular e-trike system in Seattle to be evaluated in conjunction with the Seattle DOT and University of Washington Urban Freight Lab. Source: Seattle DOT.

UPS E-TRIKE PILOT PROJECT

The Urban Freight Lab (UFL) includes private partners such as UPS, which is exploring the use of electric trikes to deliver in dense urban locations with limited mobility or large vehicle access. The pilot project proposed includes a prototype hub/spoke system which can theoretically remove a truck from operation and replace it with a single e-trike delivery vehicle.

Project Types

Research, Metropolitan Plan, Pilot.

Period of Performance

November 2018 - November 2019.

Project Sites

Seattle, Washington, USA.

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Topics Addressed

- Air quality/environment.
- Curbside delivery.
- Economic competitiveness.
- Energy consumption.
- Land use interaction.
- Last mile delivery.
- Livability/quality of life.
- Logistics/distribution.
- Mobility/congestion.
- Safety.
- Supply chains.
- Other: equity.

Expected Outcomes

The pilot project has been approved by the Mayor's Office. A project-launch press event was held on October 25, 2017 to highlight the pilot and its possible outcomes. The University of Washington has received permission to proceed with data collection and the UFL is on call to review the pilot project and evaluate its efficacy and any potential modal conflict issues. Initial outreach had concluded. The project was viewed so positively by the public that promotional shots had to be extended to allow passers-by the chance to take pictures with the UPS e-trike and driver.

Stakeholder Involvement

Seattle Public Utilities is convening Food Rescue Lab meetings. Seattle DOT and University of Washington UFL are mapping and evaluating supply chains.

ACKNOWLEDGEMENTS

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FHWA's Office of International Programs provided important support that made possible FHWA's coordination with the European Commission on urban freight research and development activities, referred to in this document as the Twinning Initiative.



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