



Spatial planning

Science topic n°2

What is the future of urban logistics?

- 1 Introduction
- 2 Transport issues
- 3 Urban logistics chains
- 4 Online shopping and deliveries
- 5 Last mile transport
- 6 Urban freight
- 7 Integration of river ports
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Ifsttar has become Gustave Eiffel University
from the 1st of January 2020

> WHAT IS THE FUTURE OF URBAN LOGISTICS?

Each year, freight transport is responsible for a million tonnes of CO₂ emissions in Paris, and almost a million deliveries are made every day in the Greater Paris Region (Île-de-France). These two record figures are partly caused by changing patterns of consumption but also the fact that urban logistics is far from optimal due to the use of outdated vehicles.

The approach adopted by IFSTTAR in the area of urban logistics is unique in France. In particular, it can draw on the results of traffic data collection campaigns and a variety of surveys, for example

ECHO¹ shipper survey. The Institute is also currently evaluating and comparing a variety of metropolitan logistics facilities, drawing up maps that illustrate "logistical decentralization"

and developing scenarios that are innovative and clean. These studies aim to inform public decision-making and help firms plan organizational changes and select different types of transport (electric or gas powered vehicles, two or three-wheelers, etc.).

Although the "last kilometre" of the journey is known to have very harmful environmental impacts, IFSTTAR is involved in attempts to mitigate them by creating new types of logistical hubs in city centres. IFSTTAR contributes to the progress in curbing the current practices.

1. ECHO: Envois CHargeurs Opérateurs (Consignments Shippers Operators)

“These studies aim to inform public decision-making and help firms plan organizational changes and select different types of transport (electric or gas powered vehicles, two or three-wheelers, etc.).”



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1 TAKING ACCOUNT OF ALL FREIGHT TRANSPORT ISSUES

*By Corinne Blanquart,
Director of the SPLOTT¹ Laboratory
AME² Department*

The volume of goods that are traded between different areas increases markedly with the economic development of cities and regions and with population growth. The trade in question is conducted by a transport chain consisting of road, air, rail, waterways and maritime components whose interactions and size must be managed in order to cope with ever more rapidly increasing demand.

Freight transport issues are of major importance for the public authorities responsible for managing mobility, accessibility and the sustainability of cities and the national territory as a whole. It is sufficient to mention that in Paris, for example, every week there are 1.5 million freight movements (collections and deliveries) and that the total flow of freight amounts to 32 million tonnes per year. This impacts directly on air quality. Pollution from freight transport in urban areas can account for 20% of total emissions from the transport sector.

Therefore IFSTTAR pursues studies that are based on integrated approaches that set out to improve our understanding of freight flow systems and evaluate their sustainability in different zones (metropolitan and peri-urban areas and corridors).

The environment that generates transport

The organisation of freight transport is closely linked to the production and trading activities that generate it. If we wish to take action in the area of transport we must be aware of the constraints that affect firms in the sectors which receive or dispatch freight (usually referred to as "shippers") and the decisions they have made previously. In order to gain an understanding of the characteristics of transport and logistics, with regard to the productive strategies of these "shippers", ad hoc surveys, such as ECHO³ and the "Truck Driver Survey (Conducteur Poids Lourd) have been conducted.

The social environment of transport

Drivers, crews, warehouse operators, order pickers, logisticians, etc.

In France, transport undertakings employ 14% of the workers in the market services sector (INSEE). In order to gain a better understanding of the characteristics of transport, with regard to individuals' relationship with their job and their work, we have focused on the characteristics of occupational groups in the transport sector and on the ways work is organised.

The spatial environment of transport

The principal nodes in transport chains, such as river ports, combined transport terminals and logistics hubs, play a key role in organising regions. They are the gateways to regions which manage the transport and logistics of freight for the consumption zones. Research in this field sets out to study urban freight transport and the presence of river ports in conurbations.

The institutional environment of transport

Sustainable mobility requires us to think about the production and distribution systems that play their role before transport. More precisely, we need to evaluate goods flow consolidation practices and the organisational solutions to be implemented at all levels of local and regional government. IFSTTAR's researchers are thus focusing their activities on developing tools which improve the management of transport and logistics in order to tailor them better to specific contexts.

1. SPLOTT: Production Systems, Logistics, Transport Organization and Work Laboratory

2. AME: Planning, Mobilities and Environment Department

3. ECHO: Envois CHargeurs Opérateurs (Consignments Shippers Operators)

“Freight transport issues are of major importance for the public authorities responsible for managing mobility, accessibility and the sustainability of cities and the national territory as a whole.”



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2 IDENTIFYING URBAN LOGISTICS CHAINS

► The ECHO/TMVProject

By David Guerrero,
Researcher

AME¹ Department, SPLOTT² Laboratory

Freight transport is a vital activity for cities and essential for their supply of goods and their economic development. The scale and nature of freight flows depend on the size and form of individual cities, and also to a large extent on how their activities are structured. In this connection it is important to identify the economic determinants of the flows.

ECHO/TMV: two surveys that complement one another

Thus, identifying these determinants is the purpose of the TMV surveys (Transport de Marchandises en Ville – Urban Freight Transport surveys). However, they only deal with a small number of cities and remain within their boundaries. Some of these shortcomings can be overcome by exploiting

the previously conducted ECHO³ survey which provides an insight into the national situation and gives a full description of the transport chains that are outside urban areas. Thus, combined use of the ECHO³ and TMV⁴ surveys improves our understanding of urban freight transport and shows how urban flows are integrated within transport chains and freight flows.

Contacts: M. Guilbault (coordinatrice du projet), F. Bahoken, C. Cruz, D. Guerrero and L. Proulhac (Ifsttar); O. Gavaud (CETE de l'Ouest, ERA Fret) et D. Patier, J.L. Routhier (LAET).



Methodological contributions: the geographical division of research

The national dimension of this study showed the proportion of the total volume of transport activities that takes place in urban areas before undertaking more specific analysis of interurban flows that examined the role of different levels of the hierarchy of cities. The second level of observation related to cities themselves and dealt not with specific cities, but "standard" cities that were constructed by grouping different urban units together to form entities that were uniform in terms of population type.

A typology of urban freight flows was then drawn up which distinguished between flows that remained within the conurbation, incoming and outgoing flows, and transit flows that passed through logistics hubs. These flows were then subjected to more detailed analysis that took account of all the available economic and urban variables, and, in particular, urban origin and destination zones.

The methodology, which was developed specifically for the study, divided a city into zones on the basis of movement densities. These provide a uniform representation that can be interpreted without reference to the type of city.

Exploiting the results

From the results it was possible to identify the routes taken by urban transport chains, taking account of the entire sequence of trips both inside and outside the conurbation. This made it possible to identify explanatory factors for the length and number of trips in the chains and highlighted the way the urban sections of the journey linked up with the rest of the chain.

The researchers then looked into the logistical organization of urban transport. They studied the relative proportions of own account, third-party transport, courier delivery services and subcontracted road-haulage. The type of carrier, journey, vehicles and departure and arrival times were also considered.

Moreover, both ECHO³ and the TMV⁴ surveys highlighted that wholesale trading plays a major role in structuring freight flows. This was also shown by an analysis that refined the conclusions drawn from the TMV⁴ surveys.

ECHO survey

An original survey dealing with complete transport chains and their links with production systems.

1. AME: Planning, Mobilities and Environment Department
2. SPLOTT: Production Systems, Logistics, Transport Organization and Work Laboratory
3. ECHO: Envois CHargeurs Opérateurs (Consignments Shippers Operators)
4. TMV: Enquêtes Transport de Marchandises en Ville (Urban Freight Transport Surveys)



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3 ONLINE SHOPPING AND DELIVERIES. WHAT TYPE OF URBAN LOGISTICS FOR PARCELS?

► The PUCA project

By **Eleonora Morganti**,
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AME¹ Department, SPLOTT² Laboratory

As in many European countries, shopping habits in France are changing fast. E-commerce is becoming increasingly common due to the spread of IT systems such as laptops, tablets and smartphones. Currently it accounts for 15% of the French retail market, i.e. €45 billion, with turnover rising at a rate of 19% according to the estimate by Fevad³.

The effects of on-line shopping on urban mobility

In the last decade, increasing use of e-commerce has led to heavy demand for order deliveries to the end user. This has produced increasingly fragmented freight flows in the end leg of distribution, known as the last mile. The number of parcels generated by distance selling (much of which comes from online shopping) has been growing since 2005 and reached 300 million in 2010.

Consequently, e-commerce raises difficulties for both infrastructure planning and distribution systems in urban and suburban areas where traffic congestion and accessibility are crucial factors. In the case of the business to consumer market (B2C⁴), home deliveries constitute the most problematic option in terms of service costs and organization. Although home deliveries are usually preferred by online shoppers (CREDOC 2010), researchers are noting the development of alternative solutions which satisfy both consumer demand for flexibility and the need on the part of firms to optimize parcel distribution through consolidated shipments (Augerau *et al*, 2008).

Pickup points are playing a decisive role in the reorganisation of commercial and logistics activities. They consist of local shops where

packages generated by the distance selling market are dropped off to be collected by their individual recipients. In general, they are attended six days a week at times of day that allow consumers to withdraw them when it suits them, with delivery costs that are lower than for home deliveries. A second alternative is automated lockers, or automated parcel boxes, which are accessible 24 hours per day and do not depend on shop opening times.

Economically, socially and environmentally efficient delivery options

The challenge for parcel delivery companies is to provide on-line logistics services with rapid delivery times and competitive prices that are compatible with consumer expectations and the requirements of web merchants. The regulatory constraints imposed by the public authorities must also be met.

With the aim of optimising delivery options, IFSTTAR (the SPLOTT and DEST laboratories), Université de Bourgogne and the LVMT⁵ carried out a research project financed by the Ministry of sustainable Development through the Urban Planning Construction Architecture Plan (PUCA).

The team was made up of Christine Belin-Munier, Leslie Belton-Chevallier, Laetitia Dabanc, Frédéric de Coninck, François Fortin, Eleonora Morganti, Benjamin Motte Baumvol.

1. AME: Planning, Mobilities and Environment Department
2. SPLOTT: Production Systems, Logistics, Transport Organization and Work Laboratory
3. Fevad: Fédération e-commerce et vente à distance (Federation of e-commerce and distance selling)
4. B2C: Business-To-Consumer
5. LVMT: Laboratoire Ville Mobilité Transport (City, Mobility, Transport Laboratory)

Further readings

Motte-Baumvol, B., Belton-Chevallier, L. Dabanc, L., Morganti, E., Belin-Munier, C. (2017) *Spatial dimension of e-shopping in France*. *Asian Transport Studies*, Vol 4(3), p.585-600.

V. Augerau, R. Curien, L. Dabanc, *Les relais-livraison dans la logistique du e-commerce, l'émergence de deux modèles*. *Les Cahiers Scientifiques du Transport* N° 55/2009 - Pages 63-95.

Morganti, E., Dabanc, L., Fortin, F. (2014a). *Final deliveries for online shopping: The deployment of pickup point networks in urban and suburban areas*. In *Research in Transportation Business & Management* 11, 23 -31.

Updated information on e-commerce and deliveries is also available on the Observatory of New Trends Impacting Urban Freight (CITYLAB project, 2014-2018)

Contact: Laetitia Dabanc



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“ Pickup points are playing a decisive role in the reorganisation of commercial and logistics activities. ”

4 LAST MILE TRANSPORT: THE ROLE OF THE COURIERS WORKING FOR PARCEL DELIVERY FIRMS

By Reinhard Gressel,
Researcher

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In the case of e-commerce, the commercialisation cycle ends with delivery of the goods to the customer. This link in the chain is the responsibility of couriers who work for the parcel delivery companies. The end leg of the transport of goods that have been ordered online and, more broadly, goods that involve distance selling, depends on the work of these couriers.

Organising working time

The starting point of the courier's round is the parcel delivery company's local agency where the consignments sent by the other agencies and hubs in the network have arrived during the night. In the very early hours of the day, these consignments are sorted in order to form the delivery rounds that will be made from the agency. These sorting operations are either conducted by specialised workers or the couriers themselves.

As soon as the parcels and letters are received, with their delivery order (very often recorded on portable tablet computers), the couriers put the packets in the correct order for their round and load them onto their vehicle. Putting the consignments for delivery in the correct order is extremely important as it determines the efficiency of the delivery round. The ability to organise the delivery round effectively depends on the courier having precise knowledge of his or her delivery zone. This includes not only its topography (which route to take, traffic conditions, temporary difficulties, parking possibilities, etc.), but also the times of day when the customers want to receive the deliveries (for example, before 9am or before midday).

Rounds that depend on the type of recipient

The delivery round proper then begins, with an initial drive, whose length is variable, to the delivery zone.

In general, driving time rarely accounts for more than 30% of the total duration of the round.

The couriers' work therefore mostly consists of taking parcels and letters from the van and walking (or more often running) from the parking space to find the recipient and hand over the consignment or consignments which have to be signed for.

The recipients in question are of two types, first professional (firms, administrations, offices and shops, for example) which usually have specialised mail departments and which often receive this type of consignment, and second, private individuals who receive such deliveries on an irregular or occasional basis. As a group, the private persons are more difficult to deal with for the couriers, as they need to be informed in advance, located, found, identified and, sometimes, told about the attempted delivery when they are absent. This

service takes a great deal of time and means the couriers must be very experienced and resourceful.

Depending on the geographical area, express delivery rounds have between 40 and 80 stops. The high levels of unpredictability, due to traffic problems and the need to locate and recognise the parcel recipients, mean the couriers are constantly having to reorganise their rounds.

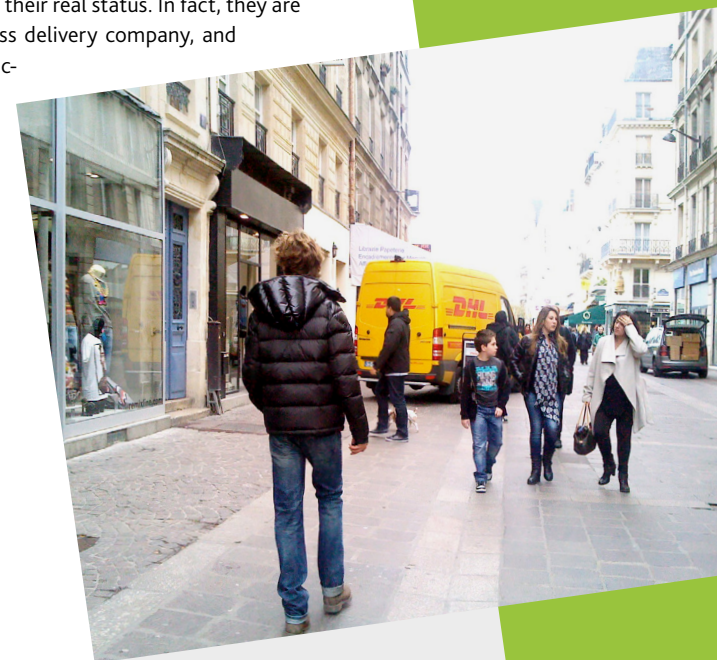
The need to find one's place among other road users

During their rounds, the couriers are impeded by other vehicles such as household refuse collection vehicles which sometimes block the road. They also have some allies, such as the couriers who work in the same area for other express parcel delivery firms. Although these are theoretically competitors, the two couriers can exchange information about the zone and they can even, unofficially, deliver each other's parcels.

The fact that they wear uniforms and drive vehicles with their firm's colours should not deceive us about their real status. In fact, they are very rarely employed by the express delivery company, and are usually self-employed contractors, or employed by another subcontractor.

1. AME: Planning, Mobilities and Environment Department

2. SPLOTT: Production Systems, Logistics, Transport Organization and Work Laboratory



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5 BETTER UNDERSTANDING URBAN FREIGHT TRANSPORT

► The MetroFreight Project

*By Laetitia Dablanc,
Director of research
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Since 2013, IFSTTAR is involved in MetroFreight, a five-year international research project on urban freight which brings together the University of Southern California (USC, leader), Columbia University, IFSTTAR, City College of New York and the Korean Transport Institute (KOTI).

The call for projects issued in 2011, received 22 proposals from a wide range of universities and cities from every continent, demonstrating a growing interest at that time for this topic. Two winners were announced, the MetroFreight project (2013-2018) and the SUFS project (Rensselaer Polytechnic Institute with the University of Westminster and Kyoto University). In addition to the partners from academia, MetroFreight brings together local authorities: the City and County of Los Angeles, the city of Paris and the Île-de-France Region, the Regional Planning agency (IAU), the Paris Urban Planning agency (APUR), the City of New York and the City of Seoul.

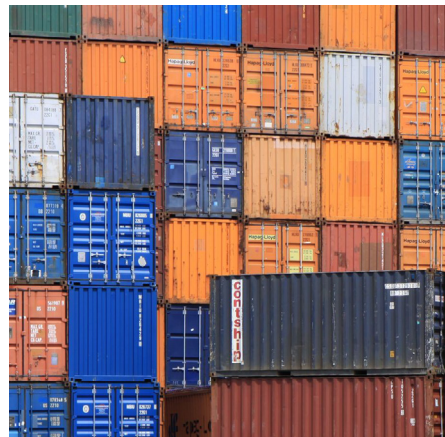
An innovative research centre

MetroFreight is financed by the Volvo Research and Educational Foundations (VREF), a foundation originally affiliated to Volvo (but independent from in terms of research content) which finances ten centres of excellence worldwide on the theme of the urban transport of the future. These centres are managed by a university or a group of universities, but the work is carried out in close collaboration with local partners (cities and regions). VREF allocates approximately €3 million every five years to each centre.

The MetroFreight research centre began has been built around the topic of very large metro areas and is marked out by its goal of achieving close collaboration between the different levels of local government in the four areas (Los Angeles, New York, Seoul and Paris). In the Paris area, as mentioned above, IFSTTAR works with the Île-de-France Region, the IAU, the City of Paris, APUR.

MetroFreight explores the following research topics:

- Databases and surveys on urban freight transport, links with land uses and spatial patterns
- Reducing pollutant and CO₂ emissions from urban freight transport
- Optimizing the last mile



◀ Urban freight transport

- Urban logistics real estate, planning and land uses
- Alternative transport modes
- Intelligent transport systems
- Congestion pricing and tolls
- Consumer trends, e-commerce

The Institute's involvement

Several of the laboratory's researchers are or have been involved in research for MetroFreight: Laetitia Dablanc (project leader), Martin Koning, Adrien Beziat, Adeline Heitz, Pierre Launay, Pierre Camilleri. Emilie Gaubert, Pétronille Rème. Françoise Bahoken, Antoine Montenon, Zeting Liu, Leise Kelli de Oliveira have also participated in the past. MetroFreight funded two theses (Beziat and Heitz), both were successfully defended in June 2017. MetroFreight also allowed frequent exchanges of researchers and students from LA, NYC, Paris and Seoul teams.

Once or twice a year, the Consortium was held in one of the four centres (LA in 2013, 2015, 2017 Paris and New York in 2014, Séoul in 2016) Regional conferences and workshops have been organised (Île-de-France).

1. AME: Planning, Mobilities and Environment Department
2. SPLOTT: Production Systems, Logistics, Transport Organization and Work Laboratory

A MetroFreight 2 project, 2018-2020 is being planned, to be confirmed within 2017 year's end.



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6 INTEGRATING RIVER PORTS WITHIN THEIR URBAN AREA IN ORDER TO OPTIMISE TRANSPORT CHAINS

► The ANR FLUIDE Project

By **Antoine Beyer**,
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AME¹ Department, SPLOTT² Laboratory

The fact that they receive containers which travel on the Seine is just the most visible aspect of the major change in the position of river ports in the metropolitan environment. A combination of economic and environmental imperatives have combined to force us to re-evaluate the role of rivers in supplying large conurbations, both in the case of maritime hinterlands and urban logistics. In the past, as they were under threat from urbanisation and for a considerable period of time without much potential for development, river port authorities tended to adopt defensive positions, asserting their status and traditional prerogatives.

The re-birth of river transport gives the port authorities a new-found legitimacy. At the national level, the basis of this is the Grenelle Environment Summit's national goals for modal transfer. From the local standpoint, it is stimulated by growing interest among cities in urban distribution approaches that provide an alternative to the road. This situation opens up a new phase of negotiation which multidisciplinary research at IFSTTAR is attempting to describe.

A multidisciplinary investigation

The aim of the researchers involved in the ANR³ FLUIDE⁴ project is not to adopt a prescriptive approach, and still less to militate in favour of the development of urban river transport, but rather to examine the complexity of the issues surrounding the river and identify their determinants in order to shed light on their links with metropolitan space.

The approach is based on a multidisciplinary approach, at the crossroads between academic,

institutional and occupational research. This is partly explained by the fact that the urban planning agencies and port authorities of the four selected cities (Paris, Lyon, Strasbourg and Lille) also took part in the project.

The major directions of the research

The diversity of these situations explains the historical differences in the city-port relationship, the position and function of ports in the urban conurbation and how this is taken into account in present-day urban planning. We have found that after the rediscovery of the leisure use and environmental benefits of river banks, partnerships between the city and the port have resulted in a reconnection with productive use. Comparisons within Europe with other major river areas belonging to our neighbours (United Kingdom, Benelux and Germany) allows us to see that French ports are involved in a wider movement, while not forgetting their specific features and the innovation they exhibit as regards river links to city centres.

A second major research direction analyses logistical functions and river traffic in the metropolitan areas. The approach employed is based on the study of specific urban distribution channels and assesses the importance of urban river transport, from cities with more urban profiles (Paris and Lille) to those with more industrial profiles (Strasbourg and Lyon), the manner in which river transport is integrated within the organisation of logistics as a whole, and the role of the ports in serving the conurbation. To this we have added a third input, the analysis of transport chains and the forms of transaction between stakeholders in a comparison between major rivers, in particular the Seine and the Rhône.

A fourth input provides essential, but often poorly known, information about the men and women who make the river system work (water management staff, lock-keepers, owner-boatmen, and freight handlers). This is an atypical group of people, whose lives are centred on the river and some whose jobs involve travelling on it. Their role in reducing uncertainty on land or in the boats is of vital importance with regard to reliability and continuity, as a fundamental feature of this transport system is its vulnerability to a variety of risks, both technical and climatic. Concerns persist within this occupational group. The renewal in the ports, which is seen from the outside as a re-birth, can be experienced as a loss as it leads to a feeling of disorientation.

A comprehensive analysis of the river metropolis

Ultimately, this research will provide firm references about the economic structure of the sector (occupations, regulations, characteristics of the market) and the sociological characteristics of the persons who work on the waterways, the characteristics of the transport chains and the urban distribution channels (organisation of transport chains, purpose and function of hubs), urban logistics (location and distribution) and city/river governance in planning projects. It will then permit a cross-cutting analysis of the river metropolis that examines analysing its stakeholders, functions and organisation as well as the different levels of the metropolitan port system.

1. AME: Planning, Mobilities and Environment Department
2. SPLOTT: Production Systems, Logistics, Transport Organization and Work Laboratory
3. ANR: Agence Nationale de la Recherche
4. FLUIDE project: FLeuve Urbain Intermodal Durable (River Transport, Urban and Sustainable Logistics)



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Further readings

The website of
the FLeuve Urbain
Intermodal Durable
project

7 WORLDWIDE INNOVATIONS IN URBAN LOGISTICS

► The SUGAR project

*By Laetitia Dablanc,
Director of research*

AME¹ Department, SPLOTT² Laboratory

Between 2009 and 2012, IFSTTAR took part in the European INTERREG project with regard to innovative policies for urban freight. This project, which went by the name of SUGAR (Sustainable Urban Goods logistics Achieved by Regional and local policies) brought together local and regional authorities from all over Europe. IFSTTAR was the only academic body in the consortium and acted as its scientific guarantor. The project focused on the transmission of knowledge and good practice: between research and practice, and between cities that are « experienced » in urban freight and others that are "learning".

Apart from IFSTTAR, 17 partners from 10 European countries were grouped together within "good practice sites", "knowledge transmission sites" and technical partners.

The transmission of good practices enabled the researchers to identify innovations in urban logistics that are taking place all over the world. Here are four examples:

The London "Low Emission Zone" (LEZ)

In 2008, an environmental zone was created in the centre of London in which heavy vehicles of less than Euro IV³ were banned. This 1,580km² zone covered the entire area enclosed by the M25 orbital motorway, i.e. most of the London conurbation. Since January 2012, vans with a GVWR⁴ of over 1.205 tonnes (non Euro III) have also been banned from Greater London.

Between 2008 and 2011, the number of Euro II, I and 0 HGVs (that have not had a retrofit⁵) has fallen from 20% of the HGVs in London before the introduction of the LEZ to almost none now. More precisely, Transport for London (TfL) has stated that the new regulation has resulted in

an annual emissions reduction of 28 tonnes of PM10⁶, 26 tonnes of PM2.5 and 529 tonnes of NO_x⁷ (TfL, 2010, data calculated for the year 2008), which represents 3.6% of road traffic emissions is the case of PM10, 3.7% for the PM2.5, and 2% for NO_x.

"Recent measurements suggest that London will probably meet the European maximum values for PM10 in 2011, and the LEZ will have played an important role in this success" (Transport for London, 2010).

On the other hand, concentrations of nitrogen dioxide (NO₂) have not fallen – the annual concentration in London in 2009 was the same as in 2004. According to TfL, this could be due to primary NO₂ emissions from new diesel vehicles fitted with a PM10 abatement system.

The urban distribution centre in Motomachi in Japan

Motomachi is an up-market shopping district in central Yokohama, south of Tokyo. Since 2007, a joint delivery system handles 85% of deliveries to the zone's shops. The remaining 15% consist

of fresh products, furniture or deliveries that are carried out in-house by large stores.

Three natural gas-powered trucks make the delivery rounds, leaving from a hub located 300 metres from the pedestrian zone they deliver to. The transport undertakings that use the delivery centre pay 150 yens (€1.45) per delivered package.

Use of the Motomachi joint delivery system is voluntary and it has not received any aid from the municipality for its development. It is essentially a local initiative on the part of the association of shopkeepers. Setting up the project required more than seven years of negotiations between the partners, and it is now firmly established and well accepted. Each year the association of shopkeepers pays an equilibrium subsidy.

Electric delivery bikes in major city centres

Delivery vehicles of a new type are currently operating in the central districts of London, Milan and Paris. These are electric delivery tricycles with fairly large carriers (between 1 and 1.5 m² that are able to carry a payload of 180kg). La Petite Reine⁸, a French firm that designs



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and sells vehicles of this type to other operators has for some time been one of the principal suppliers of electric tricycles. About ten firms are currently using delivery tricycles in Europe's major cities. Some of them are very large firms (Office Depot in London, FedEx and TNT in Paris) and others are small start-ups (The Green Link, La Petite Reine), which mainly operate as subcontractors for the former. For example, The Green Link makes some deliveries for TNT and FedEx in central Paris.

Underground logistics bases in Paris

New « urban logistics spaces » have arrived in cities. These experiments are at the moment mainly confined to Paris, but they are beginning to appear in some provincial cities. After issuing a call for tender, the local authority provides, for a modest rent, a space of between 600

and 1,000 m² in a municipal car park which is managed by a concessionary. In return, the holder of the contract undertakes to use only clean vehicles (electric or gas-powered vans, electrically-assisted tricycles). There are five such underground logistical spaces in Paris, one of which is operated by Chronopost (under Place de la Concorde) and another by UrbanCab (Pyramides). These underground bases are supplied once or twice a day by vehicles which although fairly large can still access the underground car parks because of their low trailer height. Environmentally speaking, this type of organisation is extremely beneficial, not only because of the mode of traction but also because of the reorganisation of the logistics of the distribution chain. This first wave of underground bases were joined by a 2,000m² logistics space in the Beaugrenelle shopping centre area, managed by Sogaris, and

a few logistics bases located at various points in the capital that are implemented by Distripolis to achieve a clean urban delivery system designed by Géodis (a member of the SNCF group) for its parcel deliveries.

1. AME: Planning, Mobilities and Environment Department
2. SPLOTT: Production Systems, Logistics, Transport Organization and Work Laboratory
3. European Emissions Standard *Wikipédia*
4. Gross Vehicle Weight Rating *Wikipédia*
5. Retrofit is the replacement of old or obsolete components by more recent ones performing the same function.
6. Particulate matter *Wikipédia*
7. Oxides of nitrogen.
8. This was an independent company when it was set up in Paris in 2001. Now it operates in a partnership with Star' Services and ARES, an association for economic and social integration. La Petite Reine has developed a vehicle which it currently markets under the name of Cargo-Cycle. It is used by a large number of other firms providing tricycle delivery services.

Further readings

SUGAR: projet Sustainable Urban Goods logistics Achieved by Regional and local policies

The final publication of the SUGAR project, co-ordinated by Ifsttar, "City Logistics Best Practices: a Handbook for Authorities" has been widely distributed in Europe. It is available online as well as in hard copy on request from Laetitia Dablanc. This book brings together, in a very pedagogical and illustrated way, some fifty urban logistics experiments carried out in Europe and in the world and evaluates the results, the successes and the difficulties.



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