

## **Project Interreg IVB Ecologistics**

### **Report on Work Package 1 action 4 (output WP1A4)**

Work package 1: Resource and Know-How Mutualisation

Action 4: Setting up a City Reference Group (for all WPs)

**WP1A4partnersinvolved :**

<b><u>Organisation</u></b>	<b><u>Partner</u></b>	<b><u>Acronym</u></b>
Eurometropolitan e-Campus	<b>Action leader</b>	Ee-Campus
Multitel	Associated partner	Multitel
Université de Mons	Associated partner (WP3)	UMons
Ecole Centrale de Lille	Associated partner (WP4)	EC Lille

## Introduction

A good visibility along the supply chain can increase the efficiency of flows from both an ecological and economic perspective, while standardised traceability data is shared between logistics partners.

For this reason, Ecologistics has developed a facility that demonstrates tracking and tracing technologies which comply with international standards set by GS1, such as the Electronic Product Code.

Funded by European programme Interreg IVB, this collaborative tool is based on teaching scenarios drawn from real problems, showing the benefit of such data exchanges.

Company visits, interviews and flow analysis were used as a basis to illustrate the advantage of sharing standardised traceability data through a network of EPCIS<sup>1</sup> servers based on some obstacles identified in the field.

The exchange of data enabled by this EPCIS network therefore provides better knowledge of stock availability, while increasing customer satisfaction through improved communication between various company departments and company partners.

Furthermore, the project has brought special attention to the specific issue of urban logistics. Urban logistics indeed presents its own challenges and constraints. These issues concern both logistics co-ordinators and policy makers, not forgetting the general public.

Also, city centres are complex and restricted spaces characterized by a great diversity. The city centres can be workplaces as well as leisure places or housing places, etc<sup>2</sup>. They are impacted by several specificities like pollution, traffic jams, high prices per square metre, etc.

People are invited to work, to live, to entertain together and permanently. Through the efforts of the community, urban quality of life progresses, according to different criteria:

- the well-being: reduction of urban traffic and CO2 levels, creation of green and pedestrian spaces, increase in safety, accessibility, cleanliness, etc.;
- the offer of goods & services: incentive toward innovative companies with more service to the people;
- the employment: measures to preserve employment in cities.

Innovation is directly linked to this approach:

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<sup>1</sup>EPCIS : Electronic Product Code Information Services (EPCIS) is an EPC global standard for sharing EPC related information between trading partners. EPCIS provides important new capabilities to improve efficiency, security, and visibility in the global supply chain, and complements lower level EPC global tag, reader, and middleware standards. Source: <http://www.ecologistics-project.eu/glossary>

<sup>2</sup> Source: AMCV (Association of Town Centre Management)

- safeguarding spaces (sustainable housing development);
- reduce waste (circular economy), recycle, reuse;
- reduce traffic (sustainable mobility): thanks to diversification of means of transportation (modes, energy, gauge ...), promote public transport, combinefreight and passenger transport;
- share the means and resources (pooling): in providing a set of collaborative tools to the economic actors.

New methods of organization the first and the last-mile delivery were also set up:

- City hubs are put in place (systems of pooling storage and transport tools)<sup>3</sup> with various advantages:
  - more spaces : very few stocks in city centres (deported stocks, remoteinventory management);
  - more bicycles and other alternative modes of delivery, with smaller templates, more economical and more sustainable, less CO2;
  - more frequent deliveries, better filled vehicles.
- Distribution in short circuits with territorial coverage and combination of means of transport: example of the Dabbawala model;<sup>4</sup>
- Pools of packaging: returnable packaging, sorting and washing stations.

In order to cope with the multiplicity of characteristics of the urban logistics question, the project decided to set up a working group composed by many different stakeholders, experts in their domain.

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<sup>3</sup>See flow analysis "Lille river ports" & "Auchan")

<sup>4</sup>See flow analysis "La Tournée" e-commerce local products in short circuits, see flow analysis "Courier Montois&efarmz") :

## Part 1: report on the City Reference Group achievements

This action has been attributed to The Eurometropolitan e-Campus (leader of this action). The aim was to set up a mixed European working group around the question of urban logistics issues and the way to exchange standardized data thanks to an EPCIS network in this particular context. The City Reference Group members (experts in urban logistics) met mainly three times during the lifetime of the project.

### I. First City Reference Group

The first meeting took place in Belgium, at the Eurometropolitan e-Campus (13, Rue du Progrès - 7503 Froyennes) on Thursday, 12<sup>th</sup> June from 9.30 AM to 15.30 PM.

The hypothesis of the project partners is that a good visibility along the supply chain can offer both economic and sustainable benefits. But as urban logistics is very complex and multi-stakeholders, we needed the help of experts in order to target precisely the processes in which the EPCIS network could be useful. That is why the goal of this first meeting was to put together different stakeholders of urban logistics (project managers, researchers, SME's, cities administration) from NWE around the question of traceability in the first and last-mile delivery. For this meeting, the goal was to set up the basis (main issues and challenges in urban logistics), explain the project and anticipate the next step which was the creation of a didactic tool showing the advantages of our ICT-based technology.



Agenda:

- 9.30 Welcome  
 10.00 Introduction of participants  
 Urban logistics: challenges and solutions by Milena Janjevic (ULB- Qalinca Labs)  
 11.00 Issues and opportunities for deliveries and pick-ups in the future by Wanda Debauche (Belgian Road Research Centre)  
 Presentation of a case study “La Tournée” by Cédric Fockeu (Worldline)  
 12.00 -13.30 Lunch  
 13.30 Sharing track and trace data between supply chain partners by Yves de Blic (Multitel)  
 14.00 Debate  
 15.30 Drinks reception

Attendance : 25 people.

<b>Name</b>	<b>Surname</b>	<b>Company</b>
Bernard	Christine	Ville de Tournai
Dendal	Tijl	VlaamseOverheid - MOW
Pauvre	Nicolas	GS1-France
Eripret	Jérome	Lille Métropole
Musin	Mathilde	Ee-Campus
De Blic	Yves	Multitel
Janjevic	Milena	ULB- QalincaLabs
Bringard	Olivier	Le Coursier Montois
Debauche	Wanda	Centre de recherches routières
Noël	Catherine	Ville de Namur
Claeyssens	Sébastien	Ee-Campus
Krushynskyi	Dmytri	TU/e
Fockeu	Cédric	Worldline
Guerlain	Cindy	CRP Henri Tudor (LU)
Guernaccini	Pierre	CRP Henri Tudor (LU)
Engevall	Stefan	Institute of Technology at Linköping University - Sweden
Desaintghislain	Baudry	Forem
Biévelez	Anthony	InnovaTechasbl
Guillermet	Paul	Vélogistics
Zamba	Joffrey	Euralogistic
Tiberghien	Bertrand	UMONS/Multitel
Goarin	François	Eurométropole
Wim	De Jaeger	Eurométropole
Deketelaere	Stéphane	Multitel

### Main issues raised<sup>5</sup> :

Transports and mainly urban transports are impacted by various factors:

- scarcity of resources: transport is fully dependent on the fossil fuel;
- demographic change: the context is the one of the sustainable development but the demand of e-commerce is increasing (people are getting more individualistic);
- heavy impact on the environment;
- logistics sector is evolving: high level of competition, information technologies are evolving, etc.

So the challenges are many:

- transports in the cities are submitted to an increasing numbers of technical, social and environmental rules (tonnage, restricted area in certain period of the day, length, ...);
- the traffic jam is also a big issue, the cost on the last-mile delivery is high: waste of time, fuel price, damaged roads, noises;
- the pollution in the cities is high;
- high prices and few spaces for stocks.

Hopefully, initiatives are taken in order to deal with those various issues and challenges:

- alternative solutions to home delivery are developing like pick up points, web-to-store, meetings,...
- massification of the flows;
- new types of transports: cargo-cycles, electric vehicles; ...
- stocks are deported outside the cities in mutualized platforms (city hubs).
- ...

### Conclusion:

The working group ended up with the conclusion that the City reference Group was a good initiative because it brings together heterogeneous participants that have to meet to make a project in urban logistics work. Indeed, in this precise case, many different actors are involved because the several issues raised are in charge/impact of/on city administrations, project managers, carriers, the population, etc. The next step has been to meet individually some of the participants to find in which situations the introduction of the EPCIS network would be interesting.

At the end of this process, we built a case study<sup>6</sup> and drafted a scenario<sup>7</sup> that was meant to be the basis for a discussion with the entire group (Second City Reference Group).

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<sup>5</sup>Sources : Wanda Debauche from the Centre de Recherches Routières and Milena Janjevic from Qalinca Labs (ULB)

<sup>6</sup>See annex 1

<sup>7</sup>See annex 2

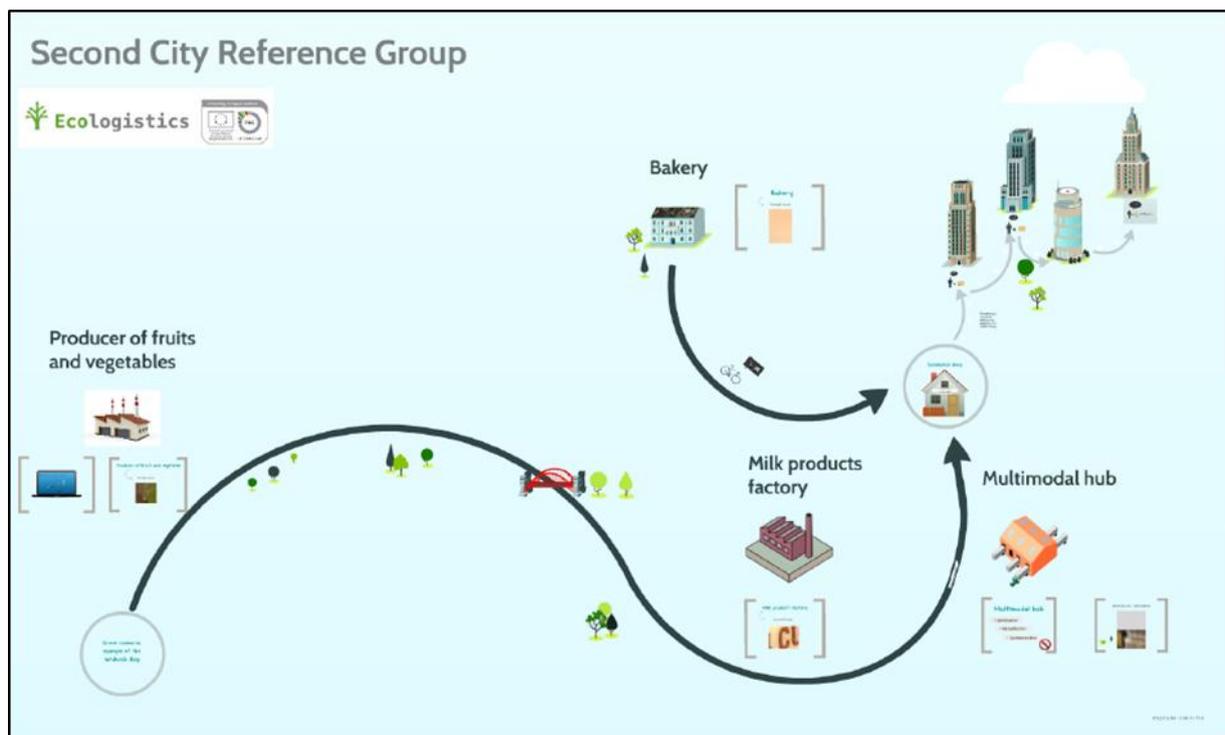
At this stage, the main logistic processes where the implementation of EPCIS network would be a very interesting were:

- between the partners of Multimodal Hubs : (mutualised and multimodal warehouses) enabling massification of interregional flows and last mile delivery optimization and stock management;
- between the flow partners of carriers and deliverymen in order to improve their journeys and rounds (better visibility on each logistic unit with comprehensive information);
- between the entire supply chain of a product in order to provide the final customer with detailed information (such as the origin in order to deal with counterfeiting or the date);
- between the entire supply chain an alert can be created if there is a problem (contamination) or a delay;
- between the entire supply chain in order to trace and return reusable assets in order to decrease the losses and the trashes.

## II. Second City Reference Group

The second meeting of the City Reference Group was designed to test the first scenario of urban logistics emphasizing traceability in the resolution (to some extent) of typical urban problems identified during our first meeting in Tournai. It took place at our partner's premises: at TU/e in Eindhoven, Thursday, 6<sup>th</sup> of November 2014.

Scenario presented (“Sandwich Shop Scenario”):



Agenda:

- 9.30 Welcome
- 10.00 Demonstration example (on the basis of a classic logistics use case)
- 11.00 Presentation of a first draft scenario showing how we could implement traceability to deal with several issues of urban logistics
- 11.30 Break
- 12.00-13.00 Workshop to modify/amend/complete the scenario
- Approval of the final version
- 13.30 Lunch

Attendance: 16 people.

Name	Company
Baudry Desaintghislain	Forem
Lan Hong	Multitel
Mathilde Musin	Ee-Campus
Yves de Blic	Multitel
Birgit Hendriks	Eco2city
Tom van Woensel	Tu/e
Behzad Hezarkhani	TU/e
Bertrand Tiberghien	Umons
AntjeBurmeister	IFSTTAR
Olivier Bringard	Le Coursier Montois
Jean-François Piche	Umons
Milena Janjevic	ULB
Charles Vangrootloon	Forem
Joffrey Zamba	Euralogistic
Nicolas Pauvre	GS1
Dmitry Krushinsky	TU/e

Conclusion:

The draft scenario was showing the supply chain of an organic sandwich from the production to the final customer. We wanted to show where the secure exchange of traceability data could be useful in an urban flow.

We demonstrated:

- the possibility to share data all along the supply chain;
- the advantages of the EPCIS Network in an urban hub (multimodal distribution) = optimization of the stocks, better synchronization with the producer and the shops ;
- the accessibility of information about the product for the final customer (just by reading a QRcode);

- the interoperability of traceability technologies.

The second part of the meeting was aimed to discuss the proposed scenario.

This was a very important step because the scenario we introduced was found perfectible by our experts (CRG's participants). Indeed, we created it based upon the idea of a restricted group and we knew that our expertise was very logistics-oriented.

The CRG's participants made us some recommendations:

- not focus on a specific product because it may not convey a clear and simple message. The "target audience" may have its attention drawn to the product only;
- acknowledge the fact that traceability on itself cannot solve some urban logistics problems on its own but can be a very accurate tool in order to support newly implemented processes (like urban hubs where traceability is paramount);
- focus on e-commerce that raises many issues but also opportunities (proof of delivery, geo and time-fencing);
- focus on each actors of the supply chain one by one, in order to target better the possible advantages of EPCIS network.

Thanks to these recommendations we made a new scenario that was approved by the City Reference Group. As it is the case for all the Ecologistics scenarios, we tried to make it didactical by creating a second Prezi<sup>8</sup>.

In order to fit better the reality, one of our experts proposed to implement the EPCIS in his daily routine. Indeed, some of them are SMEs working in the cities. The one that proposed was the Cargo-cycle situated in Mons "Le Coursier Montois". In order to have larger flows to follow, we met one of his providers, the e-distributor Efarmz situated in Anderlecht which is working with organic and handicraft products. We programmed our interface (the Open ERP ODOO) interacting with the EPCIS and we followed the boxes from the logistic platform of Efarmz to the final customer. For one entire working day, at each logistics step, we scanned the boxes. In addition, we use this opportunity to make a video that could later explain and demonstrate the advantages of EPCIS network.

We followed the logistical process involved in orders of customers from Mons.

First, an order is placed via the Internet. The customer fills his basket before 1pm on Wednesday for delivery on Friday afternoon.

The e-Farmz logistics platform is delivered on Thursday evening and very early on Friday morning. Orders are then prepared in two stages. Dry products are selected first, and then they are complemented by fresh produce to be placed in insulated boxes.

The orders are then loaded ready to be transported to a depot point or a bike carrier. A label identifies each package to ensure that it can be traced individually until it is delivered to the

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<sup>8</sup> See annex 3

end customer. Each label is read before loading into the lorry. This reading creates a traceability event in an EPCIS server, thus recording which parcel number was read and the details of where and when, as well as additional data such as updating the package status.

When it is received by Le CoursierMontois, parcel labels are read again and a new traceability event is created and the status of each package updated.

Le CoursierMontois then prepares for operation and loads the first packages to be delivered to Mons and its surrounding areas.

Upon delivery to the final customer's home, one final traceability event is created that provides proof of delivery of the order. The EPCIS standard is provided for storing geo-localised data about the place of delivery. Therefore the complete processing flow of each order is what is traced.

This data is available for access and processing by information systems of authorised partners. For example, knowing the rotation speeds and downtimes of insulated boxes can reduce their stock numbers; it is also possible to specify how much they cost supplier by supplier, reference by reference, order by order, etc. Another crucial feature is that the last known position of each logistics unit can be treated individually, for example to set off an alert if a parcel falls behind its delivery schedule. Therefore, if partners in the logistics chain are better synchronised this will help to avoid unnecessary journeys, improve stock management, increase the responsiveness of operators, and thus encourage effective and sustainable logistics.

### **III. Conclusion: final conference**

The results were shown during the final conference of the project, the 5<sup>th</sup> of June 2015. The project partners presented the main recommendations of the City Reference Group in a Prezi, a video and with the demonstrator available for the participants on that day.

The visibility thanks to technologies emphasized by the project can't help directly to reduce the various issues raised during the first meeting but it can help to have more trust for example on the alternatives put in place. The visibility provided by the EPCIS networks will consolidate sustainable development efforts undertaken by towns and cities while continually improving the efficiency of logistics for logistics providers. Indeed, better synchronisation between players in the supply chain enables better organisation of trips, especially during the final kilometre, thereby reducing the number of vehicles in urban centres. Moreover, better visibility allows space savings through greater optimisation of stock levels and a more reactive approach for better customer service.

Link to the video: <http://www.ecologistics-project.eu/content/urban-logistics>

Attendance: 55 people

Agenda:

8:30 – 9:00	Registration and welcome
9:00 – 9:15	Presentation of the project and the agenda of the day ( <b>Bertrand Tiberghien – University of Mons</b> )
9:15 – 9:25	Speech from the JTS ( <b>Benoit Seguin – the Joint Technical Secretariat</b> )
9:25 – 9:45	Assessment of the gains brought by EPCIS ( <b>Nicolas Rigo – DART consulting</b> )
9:45 – 10:40	Showcase of scenarios: urban logistics and food industry ( <b>Jean-François Piche – University of Mons and Yves de Blic – Multitel</b> )
10:40 – 11:00	Coffee break
11:00 – 11:25	Traceability of the cardboard boxes in the supply chain thanks to EPC ( <b>Bertrand Helle – Cartonneries de Gondardennes</b> )
11:25 – 11:50	Interfacing between CAPM software and the EPCIS network and perspectives for Forem's training courses ( <b>Emmanuel Jacob – Forem</b> )
11:50 – 12:10	Which opportunities can Ecologistics offer for companies? ( <b>Bertrand Tiberghien – University of Mons and Joffrey Zamba – Euralogistic</b> )
12:10 – 12:30	Questions and Answers
12:30 – 13:30	Lunch break
14:00 – 15:00	Study visit of the multimodal platform Delta 3
15:15 – 15:45	Visit of Euralogistic
16:00 – 17:00	Networking drink



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Project Interreg IVB Ecologistics : output WP1A4  
 Author: Eurometropolitan e-Campus  
 16/10/2015

## **Part 2 :Summary of City Reference Group recommendations**

### **I. Environmental impacts of the introduction of EPCIS network in city logistics<sup>9</sup>:**

First benefits are mainly related to the reduction of burning fossil fuel. Indeed, ECPIS allows to better know the exact last position of logistics units, improving so the supply chain efficiency and reducing the transport of extra materials or reducing possible rerouting of trucks.

Another benefit is related to the truck fill rate which can be improved thanks to EPCIS. Knowing where trucks are, knowing their current fill rate allow to plan in real time additional collections of additional logistics units, reducing so the number of VKM. Exchanging information between partners of a same SC is one issue, exchange data between competitors is another one. Indeed, thanks to EPCIS, competitors become coopetitors mutualizing some externalized logistics activities such as delivery processes and directly reducing their costs and the environmental impacts by reducing the number of vehicles on the road.

The above mentioned benefits are mainly related to the transport activity. However, other impacts can be expected. EPCIS can be used to ensure that hazardous materials are safely packaged, stocked, transported or that combination of hazardous materials in a same truck are suitable as regards of regulations, reducing the risk of hazardous materials spills in the environment.

EPCIS is also expected to considerably reduce food wastage in some supply chains thanks to a better temperature tracing and a better check of the cleanliness of reusable assets such as isotherm boxes. To conclude, the visibility provided by the EPCIS networks will consolidate sustainable development efforts undertaken by towns and cities while continually improving the efficiency of logistics for logistic providers. Indeed, better synchronisation between players in the supply chain enables better organisation of trips, especially during the final kilometre, thereby reducing the number of vehicles in urban centres. Moreover, better visibility allows space savings through greater optimisation of stock levels and a more reactive approach for better customer service.

### **II. List of precise processes where traceability is beneficial both in an ecological and economic perspective:**

#### **1. Basic traceability of goods**

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<sup>9</sup> Source: "Analysis the technologies promoted and developed as part of the EcoLogistics project, from an environmental and economic perspective", DART Consulting sprl, 2015.

Every single logistic unit can be traced with information about the designation of the product, its localization, when it has been localized and what is the logistic step associated with it.

## 2. Traceability of reusable assets

Thanks to the same process used for goods, every boxes or pallets can be traced. As their position is known, it is easier to organize their collection, to create an alert if unmoved for a long period of time. It helps to avoid loss and wastage. It is also possible to know the rotation speeds and downtimes of boxes in order to reduce their stock numbers. Eventually, it is possible to specify how much they cost supplier by supplier, reference by reference, order by order, etc.

## 3. Traceability dedicated to end costumer

An alert can be sent to the final costumer if there is a delay in the delivery. They can also be provided with information about their purchase (for example the date or the location of production). Such information can also help to fight against counterfeiting.

## 4. Traceability dedicated to green logistics

A better visibility on each logistic unit can improve stock management but within the cities, where commercial spaces are very expensive it can provide shops more trust on remote stocks and even more in mutualized hubs.

Initiatives like city hubs can foster the use alternative transports (like little electrical vehicles or cargo-cycles) because as shops have a good vision on their inventory and so can rely more on several delivery with few items.

These transports, in turn, can better organise their journeys and trips. Finally, thanks to geo-localized data associated to final logistic step of the unit, the deliverymen can have a secure proof of delivery.

## Conclusion

To conclude, the visibility provided by the EPCIS networks will consolidate sustainable development efforts undertaken by towns and cities while continually improving the efficiency of logistics for logistic providers. Indeed, better synchronisation between players in the supply chain enables better organisation of trips, especially during the final kilometre, thereby reducing the number of vehicles in urban centres. Moreover, better visibility allows space savings through greater optimisation of stock levels and a more reactive approach for better customer service.

## ANNEXES