

City Logistics and electro mobility

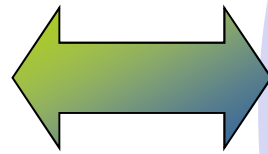
Dominique BREUIL
Northumbria University
8/1/13



Les Domaines et compétences

**Intelligent
integrated
Mobility**

**Coastal
energies and
protection**



Fluid structure coupling

Charge and Energy Storage

Energy cinversion

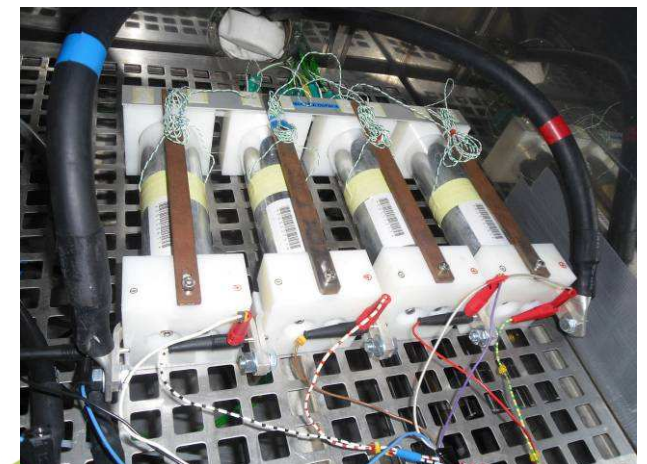
Management of flows

**Methodolgies and tools
for decision making**

Transports propres

- ❑ Essais et expérimentations de batteries : analyse de comportement et études des impacts environnementaux
 - ◆ Essais de packs batteries
 - ◆ Essais de roulage
- ❑ Aide au choix de flottes de véhicules propres
- ❑ Optimisation de la charge rapide des batteries de technologie Lithium ainsi que de l'évaluation des paramètres sur leur vieillissement

Partenaires : SAFT, EADS, PSA, Renault, Alstom, La Poste, VW, Nexter, SVE, Heuliez, Michelin ,.....



Transports propres

□ Expérimentations

- ◆ **LOCO : projet Alstom (NL)**
évaluation et comparaison de batteries pour locomotives de traction en gare (2010-2014)
- ◆ **CityMobil 1 & 2 (PCRD) :**
participation à la mise en œuvre de la démonstration de véhicules automatiques (cybercars) dans la ville de La Rochelle (2010-2011, et 2012-2014)
- ◆ **EVER Gestion optimisée des infrastructures de charge , AMI Investissements d'avenir, ADEME 2012-2015, leader Veolia Energies**



- ◆ **Tests en roulage de véhicules électriques, comparaison de performances et analyse d'adaptation à l'utilisation (2009,2010, 2012.....) :**
 - ◆ **Utilitaires pour le transport de marchandises en ville**
 - ◆ **Voitures pour libre service**

Transport Propres

□ Projets de recherche

- ◆ **SIMSTOCK(Prédit fin 2011)) et SIMCAL (ANR fin 2013) : modélisation du comportement de stockages d'énergie embarqués pour véhicules routiers. (14 partenaires, PSA, EDF, CEA, SAFT, Renault...)**
- ◆ **LIFEMIT (ANR, fini 2012) : conception et l'expérimentation de logiciels d'optimisation en temps réel de batteries LI ion en fonction de l'évolution de leurs principales caractéristiques (leader SAFT, partenaires NEXTER, univ Nancy)**
- ◆ **AMARE (ADEME, fini 2012) : Système de recherche automatisée de véhicules électriques sur voirie, accrochage pour platooning (leader Modulowatt, partenaires Valeo, INRIA, ADM Concept, 4ID,)**



Mobilités



- ❑ **Organisation de la Mobilité Urbaine de demain**
 - ◆ Intégration des flux marchandises et passagers
 - ◆ Optimisation des flux et dimensionnement des moyens (transport et stockage)
- ❑ **Evaluation des projets d'innovation en transport urbain**
- ❑ **Interopérabilité entre acteurs : optimisation des organisations et développement d'outils d'échange**
- ❑ **Informations passagers : portail d'information multimodal**



Partenaires :

Communautés urbaines et AOT de La Rochelle, St Etienne, Preston, Liverpool, Santander, Lisbonne, Régions PC, Basse Normandie, Bretagne.....
Veolia, Renault, Sogerma, Delphi, Alstom, et PME

Theses

Intégration du transport Passagers/Marchandises. (2012)

Evaluation a priori des projets de transports urbains. (2012)

Impact des technologies de type RFID dans le pilotage des chaines logistiques et notamment au niveau des aires urbaines, (2013),



☐ Projets de recherche en cours (octobre 2012)

- ◆ **START** : Amélioration de l'intermodalité inter régionale, développement d'un portail d'information multimodale, INTERREG IVB, suite de PARTNER, leader Mersey Travel, 14 partenaires, 2009-2013
- ◆ **CGOODS** : Développer un outil d'aide à la décision pour optimiser et intégrer le TMV dans les politiques de transport urbain, ANR, leader EIGSI, 3 partenaires,
- ◆ **PRODIGE** : Objectif Impact sur la chaîne Logistique du routage intelligent des produits, ANR, leader IMS Bordeaux 1, 8 partenaires, 2009-2013
- ◆ **TRAILBLAZER**: Mise en oeuvre et évaluation de projets de Transport de Marchandises en Ville dans 4 villes moyennes et préparation pour 3 autres, EIE, leader TTR (UK), 10 partenaires, 2010-2013
- ◆ **ECLUSE** : Accompagnement mise ne place TMV à St Etienne, leader Mines de ST Etienne, 3 partenaires, 2010-2012
- ◆ **CLIMATLANTIC** : Définition de stratégies régionales pour réduire l'empreinte carbone, INTERREG IVB, s/t Agglomération Angoulême, 2010-2013
- ◆ **NOSCIFEL** : développement de connecteurs techniques et informatiques sécurisés à chacune des étapes de la chaîne logistique Investissements d'avenir/ ITS, ADEME leader Chrono services, s/t IMS Bordeaux 1, 2012-2014

Urban freight ?

□ Three main flows :

- ◆ Flows related to the commercial and industrial organisations : mainly B2B relations and all supply chains flows
- ◆ Movements B to C (home deliveries, e commerce,,...) or generated by private individuals to supply themselves for any type of goods
- ◆ Goods flows caused by the other activities called “annex flows” such as the transport of waste, removals, home deliveries, hospital and the mail service. These are mainly B2C or G2C flows



Actors and stake holders

- **Four groups of key actors are identified (Taniguchi et al. 2001) :**
 - ◆ **Shippers (manufacturers, wholesalers, retailers,.....)**
 - ◆ **Freight carriers (transporters, warehouse companies,... and all shopkeepers and craftsmen who transport their own supplies)**
 - ◆ **Residents (consumers, citizens)**
 - ◆ **Administrators (national, state and city level) for their own purposes (ex food for schools) or for collective services (ex waste)**

Urban freight ?

- 
- ❑ **Is an old problem** *from 45BC it has been submitted to laws*
 - ❑ **Is a crucial economic problem** : *dynamism and life of cities centres depend on goods supplies*
 - ❑ **Is a disruptive problem** : *congestion, pollution, noise, security, health*
 - ❑ **Is a multi headed problem** : *numerous stakeholders with contradictory objectives, everybody proposes its own optimised solution*

👉 **Specificity of medium sized cities ?**

Main constraints

- ❑ no single client with control over premises
- ❑ limited governance of municipal authorities
- ❑ proliferation of operators in open competition
- ❑ increased time sensitivity of most consumers
- ❑ lack of knowledge, interest and competence
- ❑ prohibitive costs for logistics of urban space

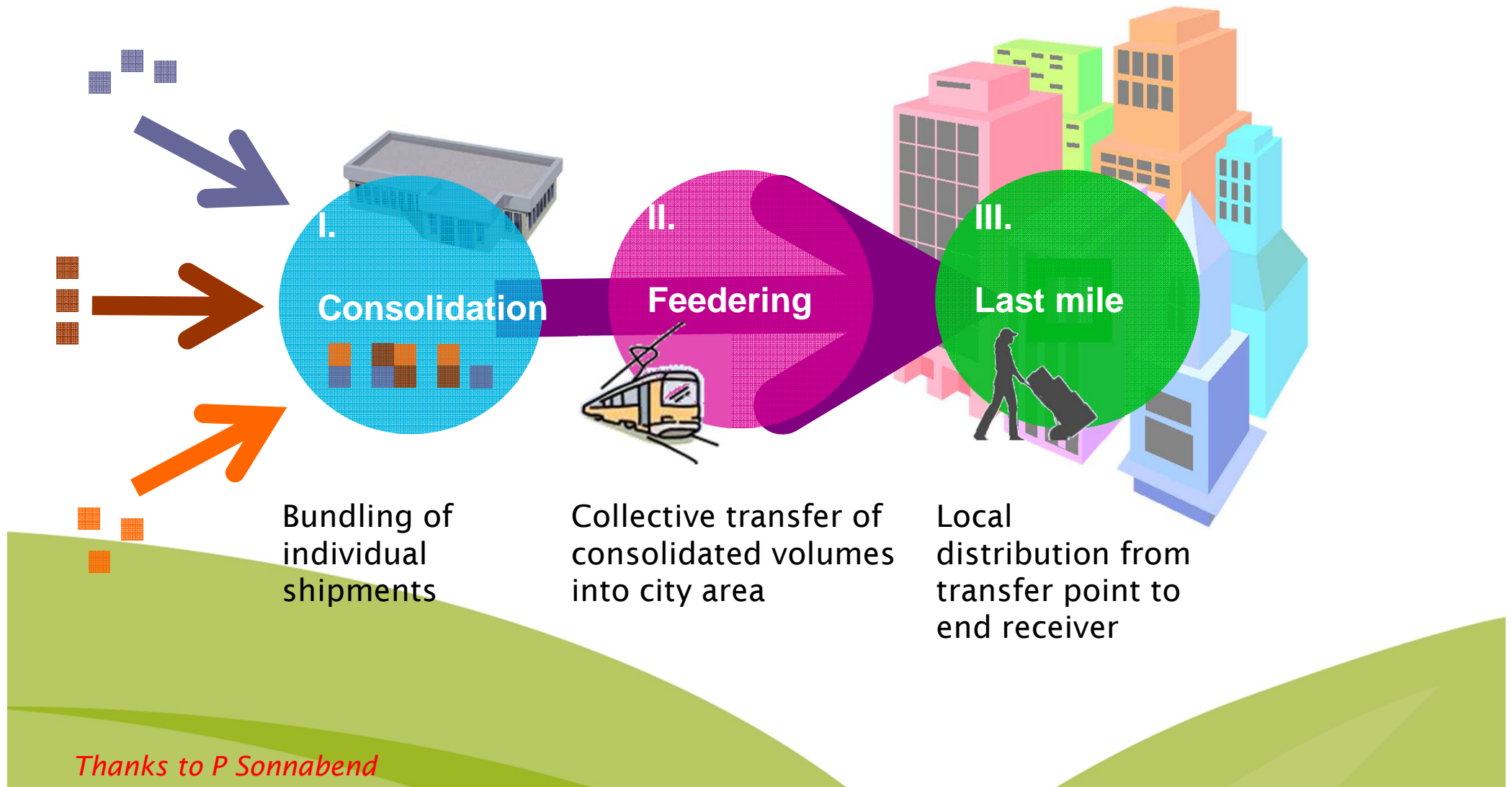


However.....

- ❑ **Efficient distribution of goods on the whole city has become a criteria to assess sustainability strategies between cities which lead to**
 - ◆ **Reduce impact on the environment**
 - ◆ **Save of time and money (increased efficiency)**
 - ◆ **Improve reliability**
 - ◆ **Improve safety**



Core elements for city Logistics





develop
structures

facilitate
city's access



Proximity
storage facilities

To use adequate
vehicles

To control



And many more solutions for the future

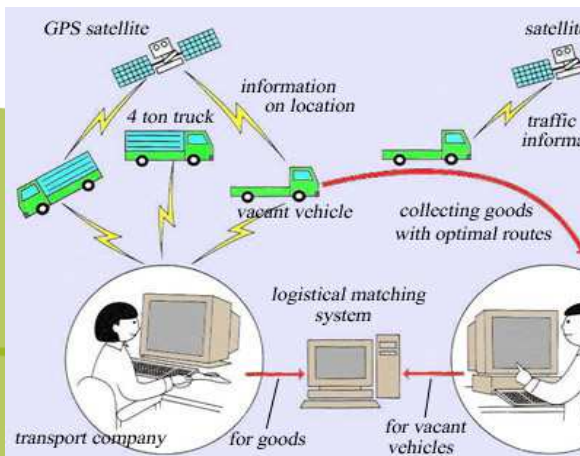
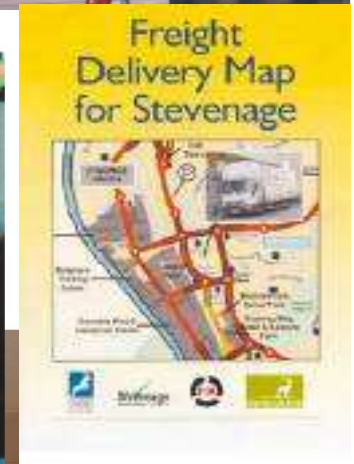
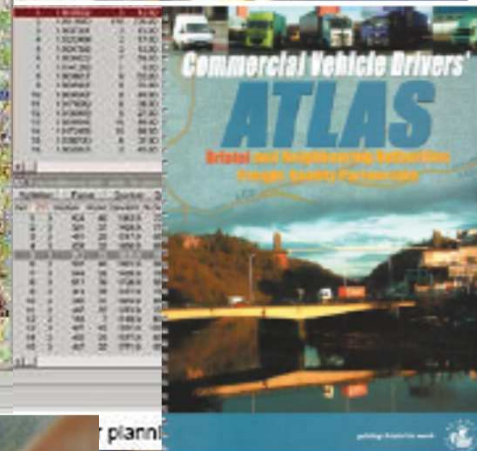
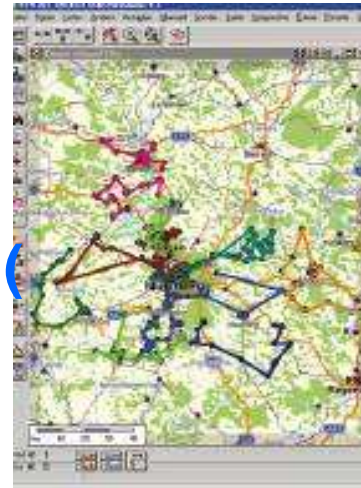
Develop infrastructures

- ❑ Manage land planning and anticipate on requirements
- ❑ Create dedicated and/or adapted roads,
- ❑ Manage access control zones
 - ◆ Pedestrian zones
 - ◆ Commercial zones
 - ◆ Low emission zones
- ❑ Optimise the planning and use of delivery bays



Facilitate City's access

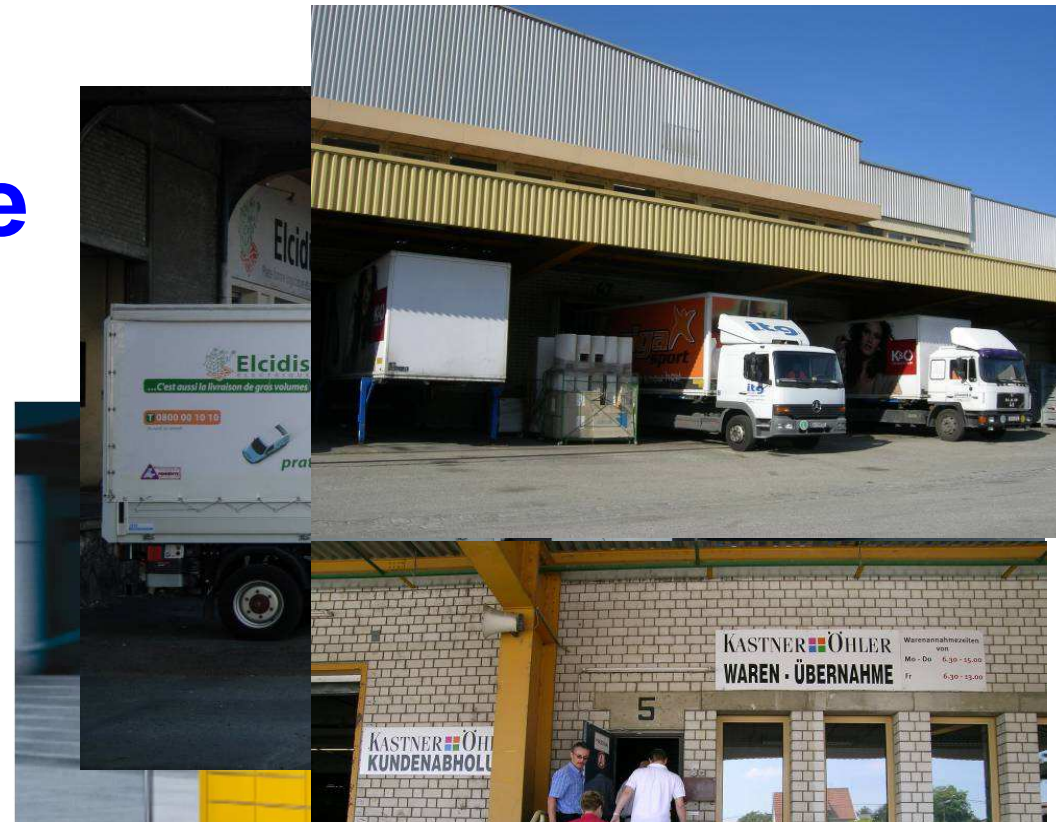
- ❑ Street signing
- ❑ Information to goods carriers
 - ◆ Static
 - ◆ Dynamic / real time
- ❑ Optimisation of
 - ◆ Transport management (& routing)
 - ◆ Traffic management



Proximity storage

□ 4 types for warehousing

- ◆ Logistic boxes
- ◆ Proximity delivery space
- ◆ Freight Consolidation Centers
- ◆ Logistics platforms , freight villages



Adequate vehicles

- ❑ Minimising negative impacts
- ❑ Easy to handle in the city context
- ❑ Adapted to the transport of various
 - ◆ Flows (frequency, batches or unit,..)
 - ◆ Types of goods



Monitor and Control

- ❑ To support other actions and control their operation
- ❑ Restrictions : weight, time,
- ❑ Congestion Charging
- ❑ Control access
- ❑ Parking and price strategies



Partnerships

- **Several types of partenrships :**
 - ◆ Resources sharing
 - ◆ Financial risks sharing
 - ◆ Knowledge transfer, information exchange
 - ◆ networks

- **Domains**
 - ◆ Information systems
 - ◆ warehousing
 - ◆ training
 - ◆ Rules and taxes

- **Freight Quality Partnerships**



Main influences on Urban Freight Efficiency

UNIVERSITÉ
Ecole d'Ingénieurs
La Rochelle
Recherche

Visible Effects

Regulation

Land
Costs

Vehicles & mobile
ressources

Partnership &
stakeholders

Combination
with transport
scheme

Information
systems

Political
involvement

Integration
in urban
planning

With some stand back, the real causes

- ❑ confusion between local optima and global optimum; the effects are visible on several aspects :
 - ◆ Each stakeholder looks for to optimise its own actions according to its own criteria
 - ◆ The area under consideration was generally the hyper centre of the city
 - ◆ Actions and experimentations were often considered independently of other improvements

- ❑ balance between technical improvements and organisational as well as managerial dimensions.

- ❑ The differences in objectives & decision horizon of the stakeholders

Electro mobility for City logistics

□ Origins

- ◆ First utility vehicles (ex cleaning, waste collect, various city services ...)
- ◆ La Rochelle Elcidis example

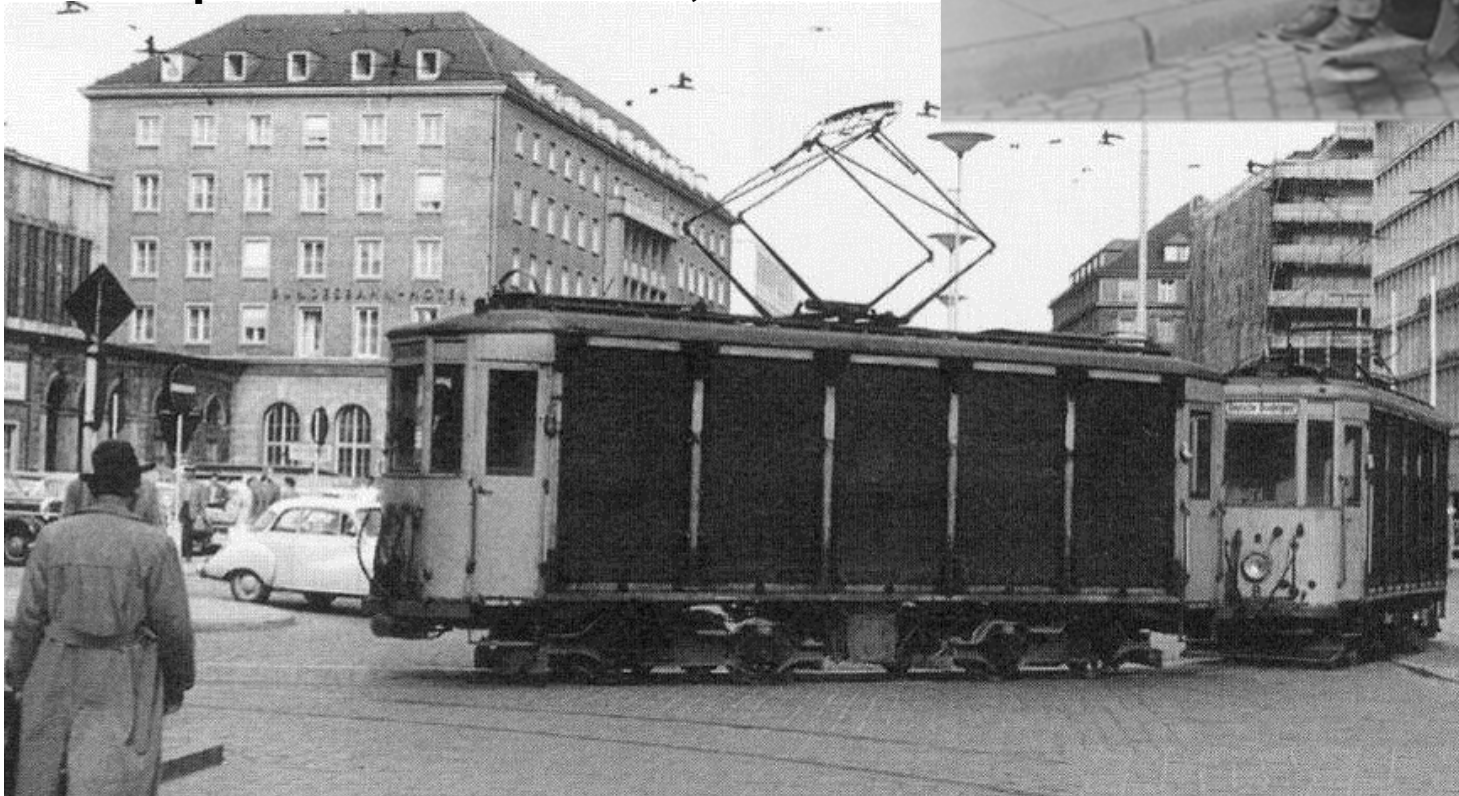
□ Current situation

□ Possible future

- ◆ Integration
- ◆ Mutualisation,
- ◆ Vehicles and resources

origins

Postal parcel tram in Munich, 1959



La Rochelle Urban Community Territory



Population

- 18 towns
- 21,000 hectares, 5,500 of urban areas (residential & industrial areas)
- 145,000 inhabitants (80,000 in La Rochelle); 12% increase over the last decade

City Logistics in La Rochelle

□ The origin : 1997- 2003

- ◆ Think tank
- ◆ ELCIDIS

□ The CIVITAS phase 2004 -2009

- ◆ New governance for ELCIDIS
- ◆ Thematic leadership for UFT in CIVITAS 2

□ The post CIVITAS

- ◆ deployment
- ◆ future experimentations

The origin

□ Initial analysis

- ◆ Historical center
- ◆ Surveys on flows and delivery practices
- ◆ Political decision
- ◆ Context of electric ve



The origin ELCIDIS project

❑ Objectives

- ◆ reducing pollution, noise and congestion caused by lorries in the city centre
- ◆ reorganising urban goods deliveries

❑ Operation

- ◆ Parcels and pallets forwarded by carriers unloaded at the platform
- ◆ Sorting by sector and delivery, street and consignee in electric-powered vehicles (Citroen Berlingo, 3.5-t FAAM)

❑ local authority as initiator



Difficulties

❑ Commercial aspects

- ◆ Competition between ELCIDIS and other carriers
- ◆ Strong effort in marketing required

❑ Technical aspects

- ◆ Electric vehicles
- ◆ Handling equipments

❑ Context

- ◆ La Rochelle is a medium sized city

❑ Organisation

- ◆ Position of local authority/operator : partnership?
- ◆ Enforcement/ constraints
- ◆ Need to define new collaboration modes

❑ Economy



CIVITAS Phase

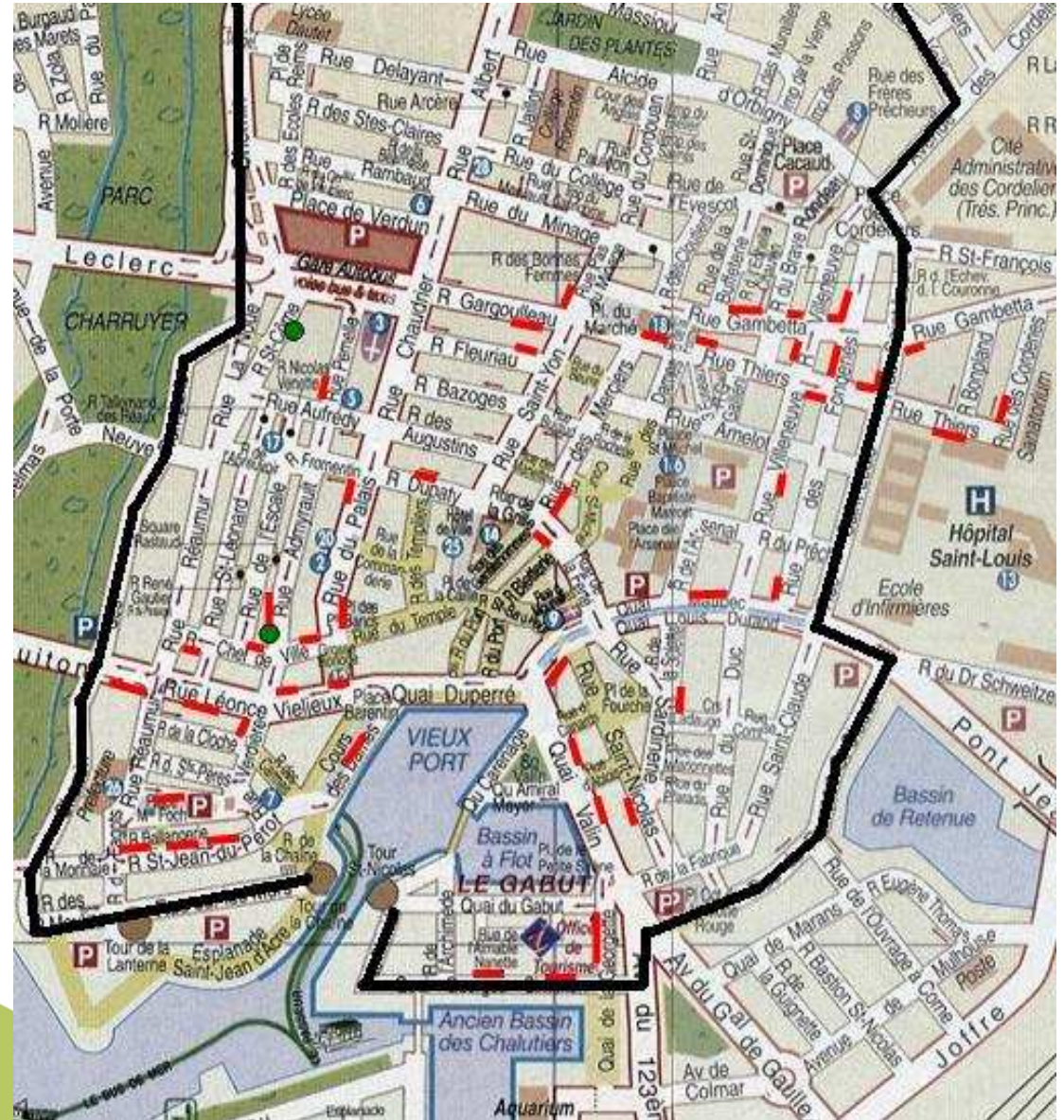
□ Public Service Delegation

- ◆ Diagnosis global analysis of all the goods flows in La Rochelle
- ◆ Detailed studies of possible activities
- ◆ Call for tender >>> innovation
- ◆ Implementation of new operation mode



CIVITAS Phase

- Development of a methodology and associated tools in order to optimise the organisation of goods in medium sized cities (in relation with thematic leadership)
- Simulation and optimisation of delivery bays



Post CIVITAS

- ❑ New organisation and vehicles
- ❑ Reinforcement of 3PL provider's activities



Current situation of eM in city logistics

- linked to
 - ◆ the deployment of logistics awareness and monitoring in cities
 - ◆ The availability of vehicles

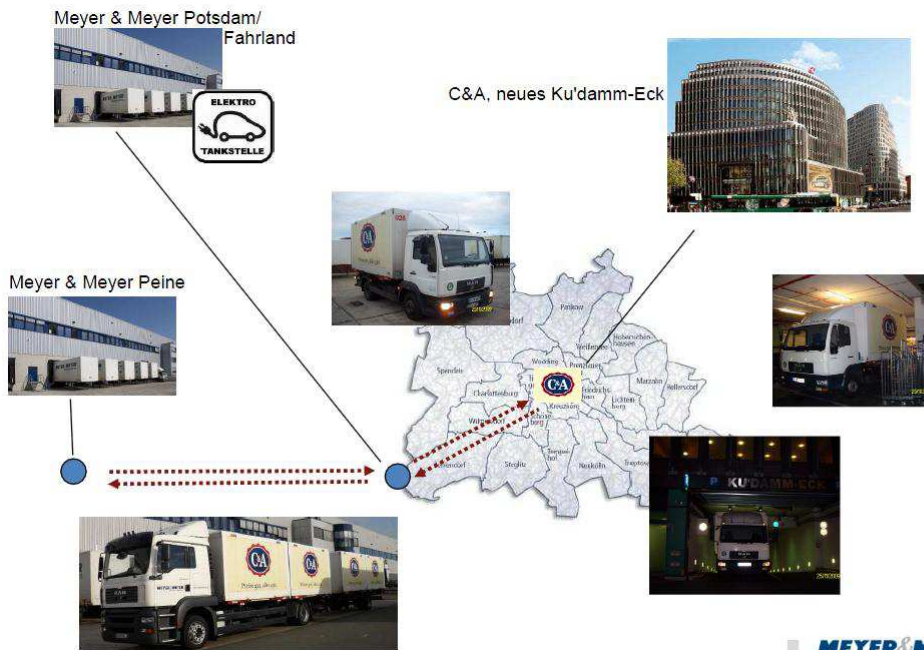
- **Difficulties for implementation**

- Several research/demonstration projects
 - ◆ DG Move (EVUE, CIVITAS), INTERREG IV (ex SUGAR), STEER /EIE (C LIEGE, ENCLOSE).....
 - ◆ National and local level

- **Isolated experimentations in many cases**

Current situation of eM in city logistics

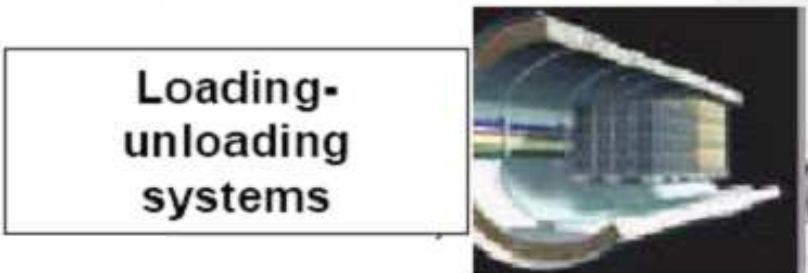
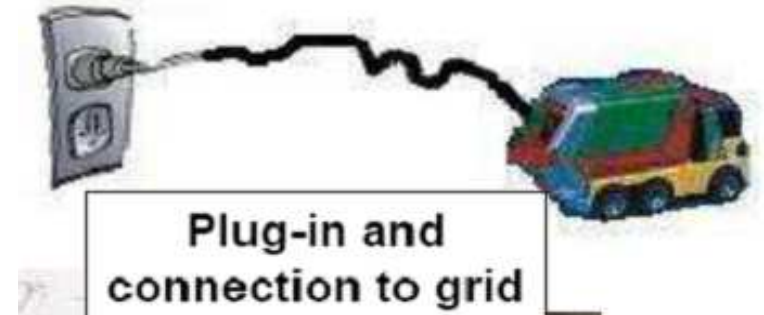
Model Region Berlin/Potsdam



Rotterdam



Futurist ?



Loading-unloading systems



Driver support

Possible future Integration

- incentives for users :
 - ◆ parking for craftsmen,
 - ◆ charging station
 - ◆ Fleet for organisations.....

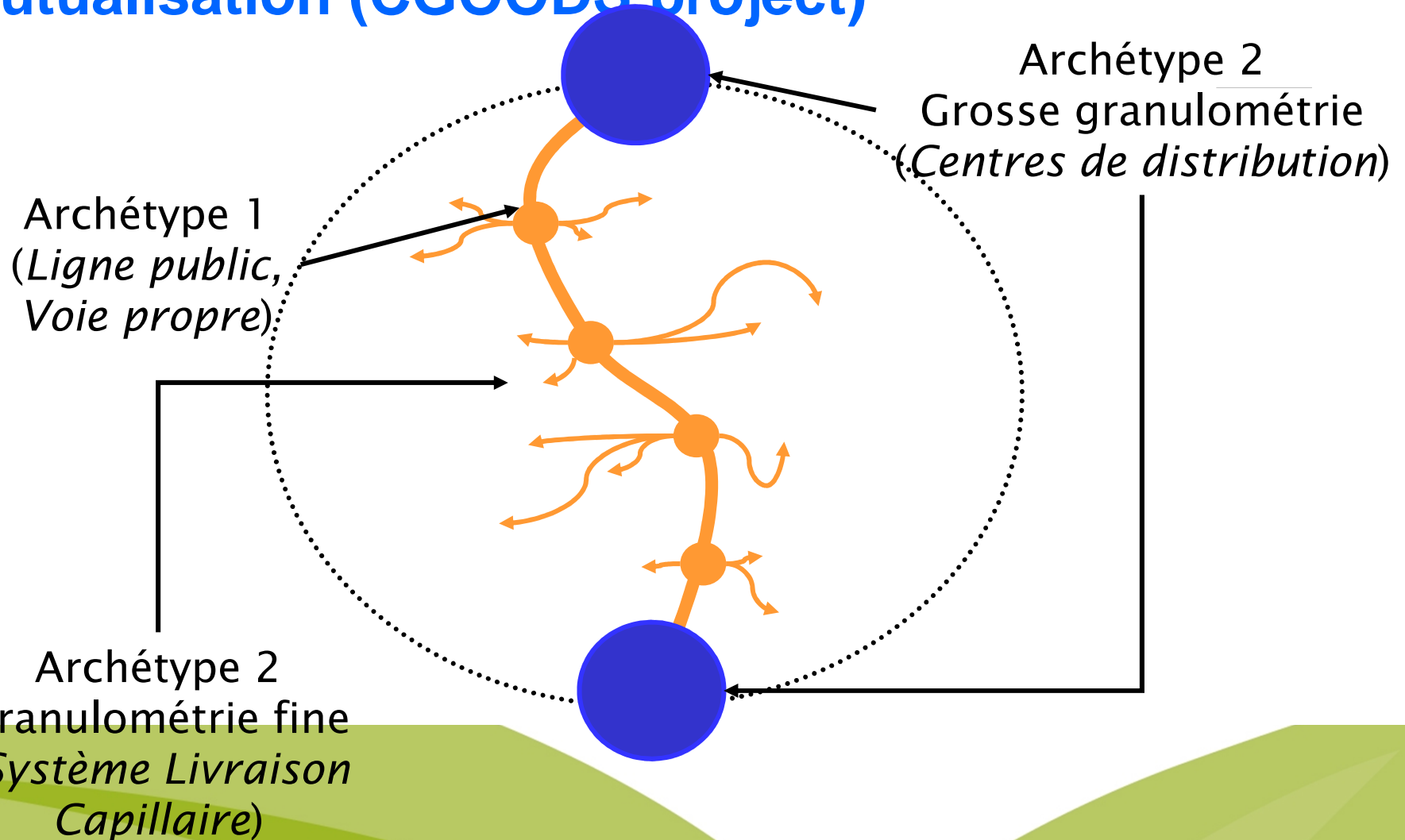
- Development of urban consolidation centers

- Regulation for city centers' accessibility

- Car pooling

Possible Future

❑ Mutualisation (CGOODS project)

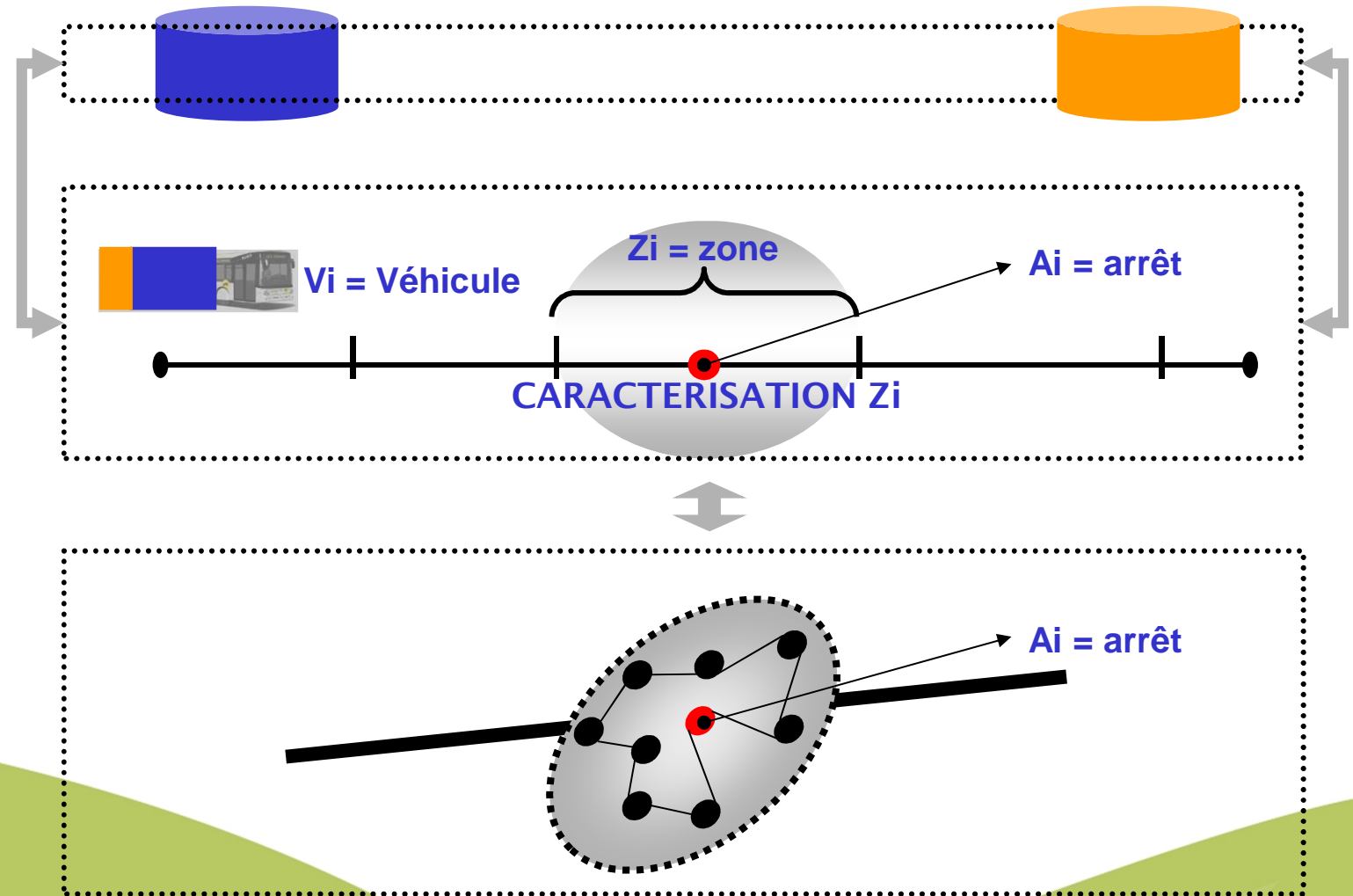


Model structure

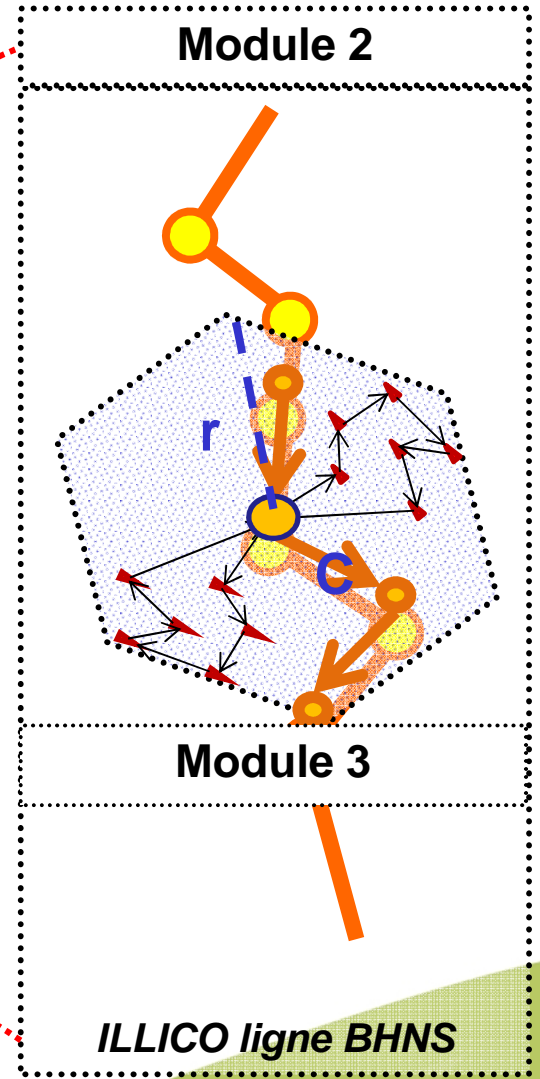
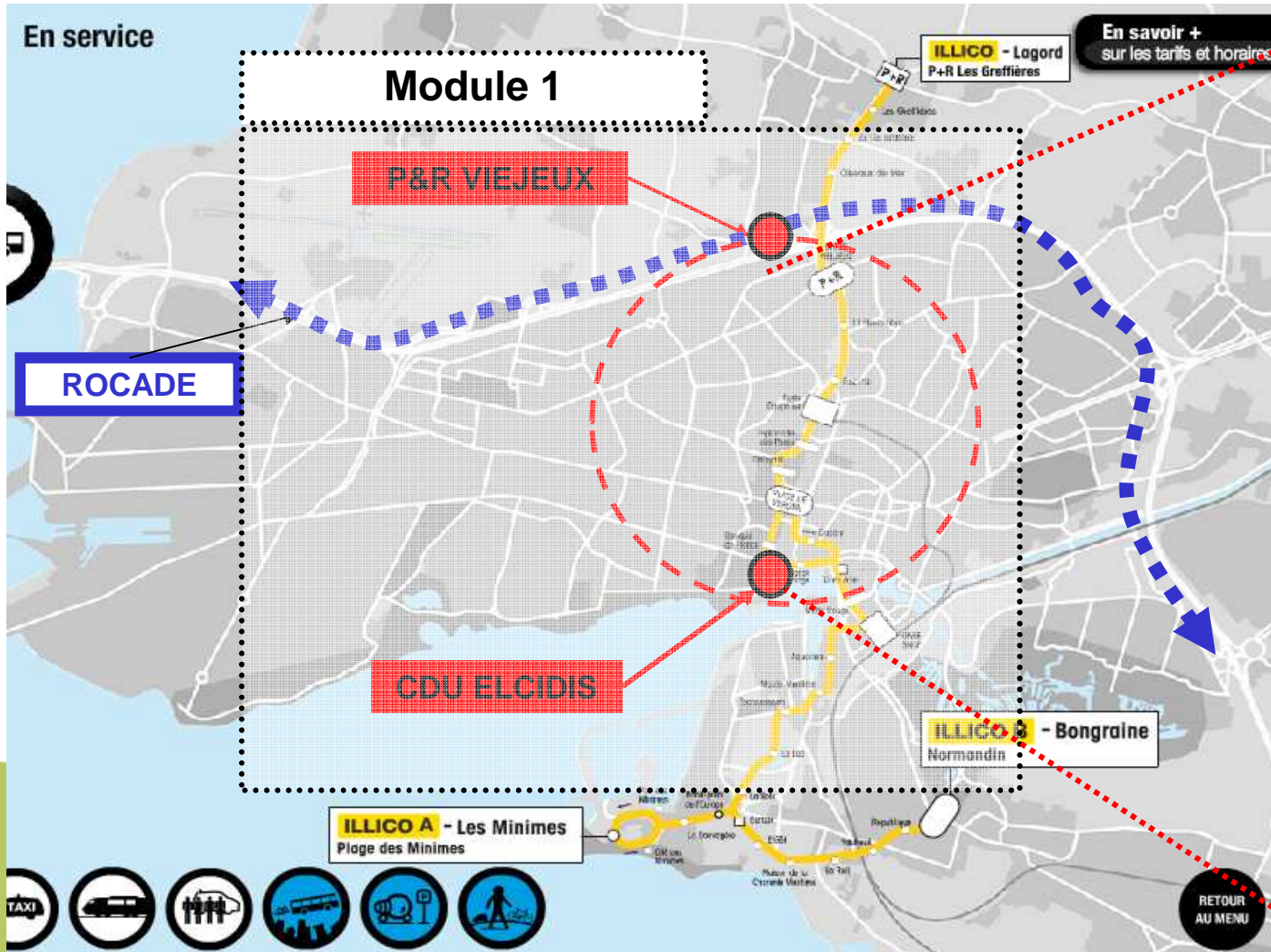
MODULE 1
ZONE DE STOCKAGE
PASSAGERS
 +
MARCHANDISES

MODULE 2
AXE TPL
PASSAGERS
 +
MARCHANDISES

MODULE 3
SYSTÈME DE
LIVRAISON
CAPILLAIRE



Mutualisation in La Rochelle



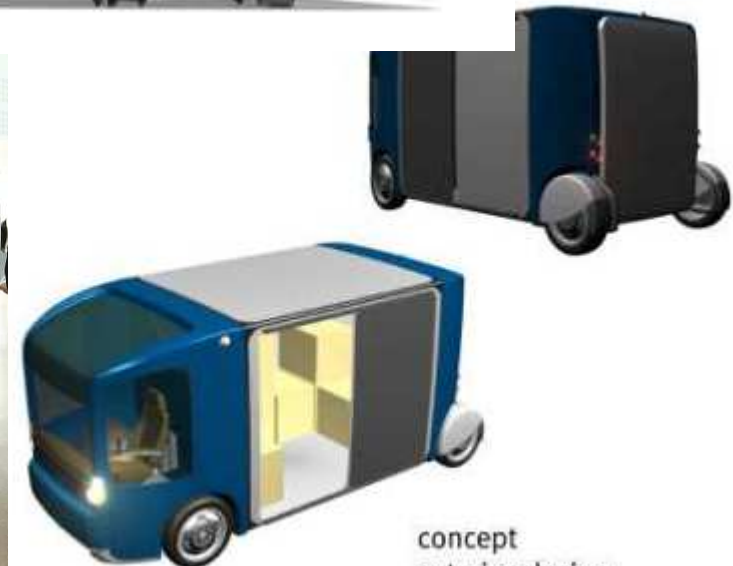


The implementation



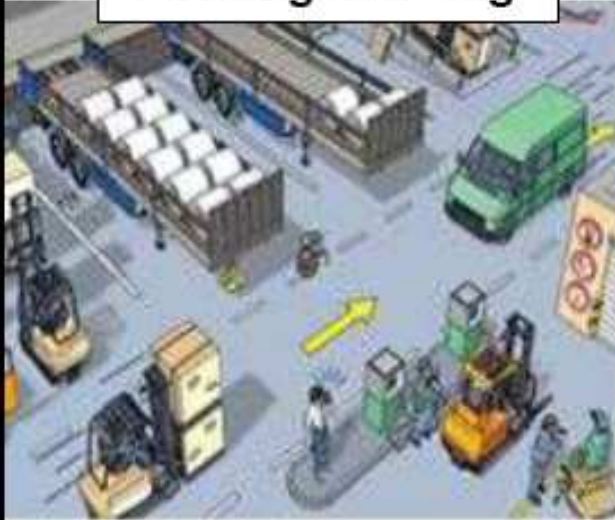
Improvements on vehicles

- ❑ Technical improvements on power trains
- ❑ New functionalities
- ❑ New designs
- ❑ Modularity
- ❑ Automation



New functionalities....

Parking booking

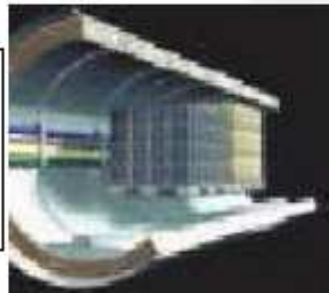


Safety & security of delivery zone



Plug-in and connection to grid

Loading-unloading systems



Support for city driving

- ❑ Intersection Assistance
- ❑ Attention Support
- ❑ Collision Avoidance
- ❑ Stop & Go
- ❑ Pedestrian Detection
- ❑ Start-Inhibit
- ❑ Load and Noise Restrictions



Volvo Technology
Intelligent Vehicle Technologies, A Sjögren
12 2008-06-12





Thank you for your attention

