

### Task 1.3.

## Assessment of the research state at the local level related to the European trends and demand analysis

### PURPOSE

*According to the DoW in order to fully understand the potential of the RCs it's important to evaluate on one side their position related to the research and innovation trends recorded in Europe and to the general state of R&TI, and on the other side the distance from the innovation demand perceived on the local market.*

*To achieve these results, it is necessary to define and to analyze the existent knowledge about the state of the European research on the specific topic of urban logistics.*

*This is the first part of the activity to be developed within tasks 1.3.*

*A specific integration will be made analyzing the trends in two main fields which represent important support technology for the urban logistics, that is the ICT and the vehicle technologies (with particular respect to electric vehicles).*

*Moreover the planning documents of the main Bodies in charge of technological development, namely:*

- *Europe 2020 Strategy with his Flagship Initiative "Innovation Union";*
- *The existing regional R&TI policies, plans and activities, their evolution and their impact;*
- *The existing national R&TI policies and support initiatives*

*will be deeply analyzed by UCV in order to prepare a reference for the evaluation of the position of each RC compared to the EU Position.*

*The second phase of the activities will be to prepare a document describing the position of the RCs activities with respect to this reference framework; this will be done according to the methodology developed under task 1.1 and the information collected in task 1.2 about the local situation in the Regions..*

*This analysis will give the possibility to characterize the specific context of the RCs with respect to the external reality in a transnational context, as the one targeted by the RCs actions should be.*

*The outcome of the work will be a report containing the above mentioned analysis and the results of the comparative positioning analysis.*

## 1. ORGANIZATION OF THE ACTIVITIES RELATED TO THE ASSESSMENT OF THE STATE OF THE ART (FIRST PHASE)

According to the methodology document assessed in task 1.1 and the subsequent segmentation of the research area the following matrix describes all the technology and products to be analysed; in the same way each Technology field has been assigned to Partners in order to perform the data collection and the preparation of synthetic status of the art of each Technological field.

	General Tech field	Specific Technology	Partner in charge
1	Freight distribution management systems	Simple software systems	FRI/LIB
		Fleet management systems	
		Integrated distribution management systems	
2	Special hardware for distribution management	Palm top for delivery management	LIB
		On-board devices for freight vehicles	
3	Special software for freight distribution systems	Software tools for freight distribution optimization	MOV
4	Support systems for regulation schemes	Access control management / charging systems	IPN
		Parking management / charging systems	
		Permissions release and management systems	
5	Automatic warehousing systems and handling systems	Warehousing systems	FRI
		Handling and picking systems and equipment	
		Loading / unloading systems and equipment	
		Automatic weight / dimension measurement equipment	
		Automatic labeling machines	

	General Tech field	Specific Technology	Partner in charge
6	Storage systems for transport	Storage systems for transport	UPV
7	Non-conventional vehicles	Application of electric vehicles to freight distribution	UPV/PE
		Application of other non-conventional vehicles	
8	Engineering and management	New regulation schemes	MET
		New distribution process schemes	
9	E-commerce platforms	Platforms addressed by specific operators to the end users for on-line buying	IPA/DMG
		Platforms b2b addressed by specific companies to other companies, shopkeepers, and other business subjects used for purchasing and managing orders and shipment	
10	Electronic devices for goods and vehicles tracking	Barcode systems	IPN
		RFID systems	
		GPS systems	
		Wi-Fi systems	

Moreover UCV is going to prepare a document related to the general European situation taking into the account: the planning documents of the main Bodies in charge of technological development, namely:

- Europe 2020 Strategy with his Flagship Initiative “Innovation Union”;
- The existing regional R&TI policies, plans and activities, their evolution and their impact;
- The existing national R&TI policies and support initiatives.

#### DESCRIPTION OF THE ACTIVITIES

Each partner has to develop the activities assigned by the task leader according to the following scheme:

1. Data collection of the documents produced within within several European Programs, Civitas, CiTylog, Smartset Bestfact etcetera. Moreover the availability of advanced products and solutions on the market should be generally taken into account. This activity should lead to identify the most important and advanced technologies / solutions and the general situation of the sector in Europe
2. Preparation of the documentation which will be constituted of two parts:
  - 2.1. A short synthesis of the general situation related to the specific technological field (descriptive)
    - General Concept / Content
    - Possible integration with other technologies ( within the same tech field)
    - Main applications in EU,
    - Research and technology development.
  - 2.2. For the most important technologies / application a specific record containing:
    - Description of the technology / solution (working principle, technical characteristics, etc.)
    - Main application in Europe experiences
    - Results of the applications done
    - Perceived potential
    - RTD activities in progress, if any

The annex template shows which are the main information to be collected.

## Annex 1

### Task 1.3: Assessment of the research state at the local level related to the European trends and demand analysis

#### Technology field: Freight distribution management systems

*(please refer to the general tech matrix developed under 1.1 task)*

#### Specific technology/solution: *Integrated distribution management system*

*(please refer to the general tech matrix developed under 1.1 task each partner for the allocated technologies)*

#### Description of the technology/solution:

Integrated Distribution Management Systems represent a complex architecture of software and hardware components, offering the possibility to control, analyze and optimize all processes related to distribution of goods.

These complex systems, include planning, execution and administration of all transports, thanks to a huge database collecting all useful data even thanks to an efficient integration with already existing software platform (digital maps) and/or connection to different tools (OBU and/or mobile phones/tablet) where a wide set of applications/tools can be installed.

Most important components are:

- a manager software to collect and analyze (cross analysis) data regarding:
  - warehouse stocks, priorities, loading systems...
  - vehicle's position and performance, planned route, driver behaviour...
  - administrative issues: orders, deliveries, invoicing...
  - reporting and performance analysis
- GIS systems to optimize vehicle's routes according to single/multiple loading/unloading operations and location of warehouses or delivery sites/customers
- On Board Units to collect and transmit data about:
  - driver behaviour
  - real time vehicle tracking and tracing (accessible even for customer)
  - optimization of vehicle's load
  - control of accesses to specific areas
  - reduce risk of vehicles brake down optimizing even by maintenance program
  - control and reduction of costs (i.e. fuel) and impact on environment

- palm/mobile devices to support “on site” operations:
  - deliveries’ notification/registration
  - billing/invoicing
  - communication to/from operators/drivers

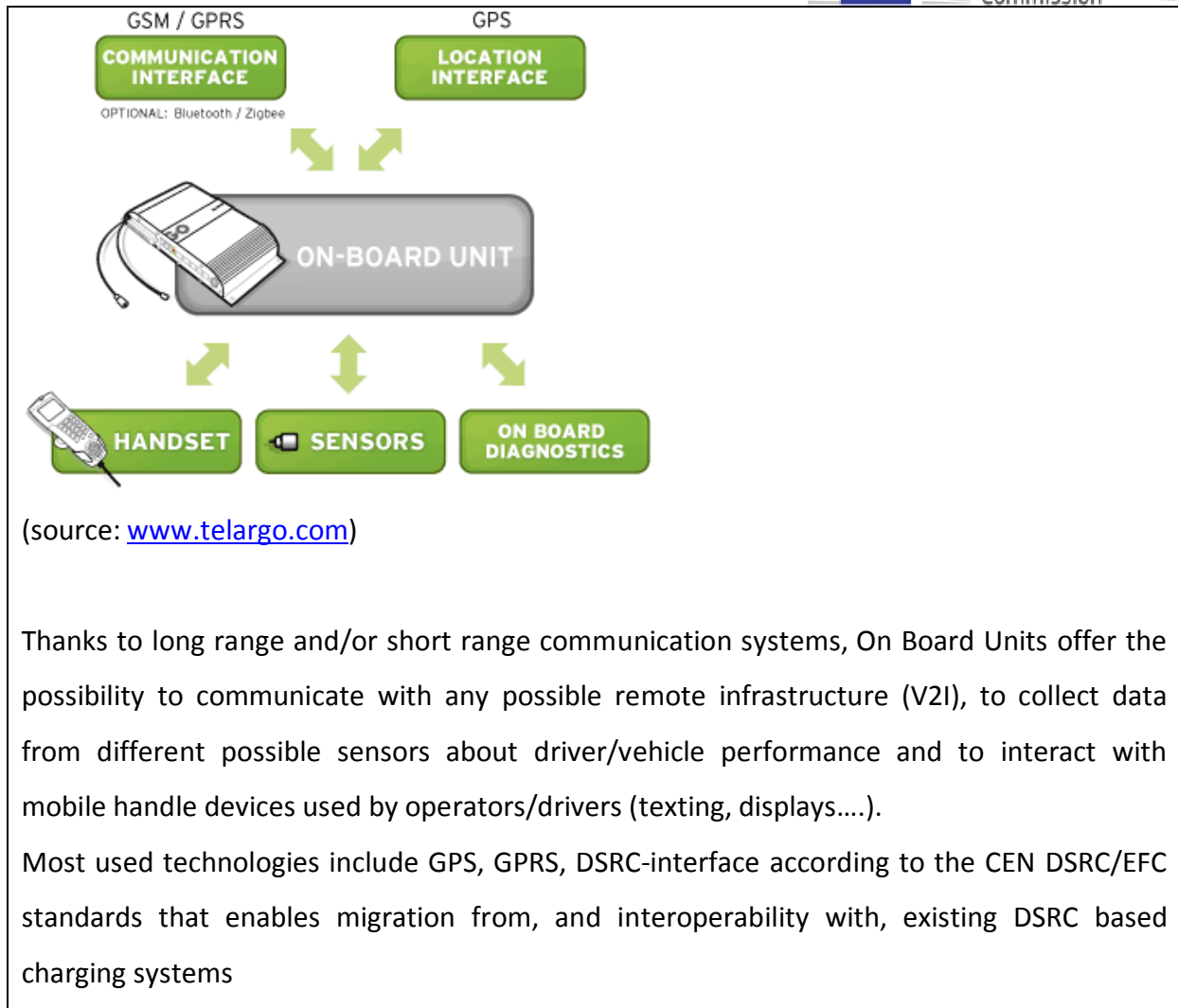
PSI Logistics (<http://www.psilogistics.com>) offers a complete solution including planning, control and optimization systems: on the one side, there is the analysis, optimization, controlling and performance assessment of logistical networks, on the other side, there is solid, data-based location and structure planning with possibility to add functionalities related to statistics, stock management, service providers cost analysis.

The solution is open to all data from any possible existing software platform, and integrates functionalities, some of them particularly innovative and interesting:

“Forecast”: it allows to manage possible evolution of relevant validated customer-specific forecasts about future demographic and economic developments as well as global and industry specific trends

“Weak point analysis” and “Mathematical Optimization” to define weak processes of the supply chain and eliminate critical aspects: the latter module, includes among the others, specific tools for “Route planning”, “Multi-modal optimization” and “Transport and warehouse costs optimization”.

With regard to On Board Units different solutions are available, according to the customer needs and willingness to collect and analyze data. Technology used for On Board Units, depends on recent regulations and recommendations defined to guarantee interoperability in different Countries (i.e. toll systems) and to support requests from the market and from Transport Service Providers, aiming at increasing efficiency of their business (route optimization), reducing costs (collection and analysis of drivers and vehicle’s performance indicators) and risks (tracking/tracing vehicles and goods, reducing risk of theft...).



Thanks to long range and/or short range communication systems, On Board Units offer the possibility to communicate with any possible remote infrastructure (V2I), to collect data from different possible sensors about driver/vehicle performance and to interact with mobile handle devices used by operators/drivers (texting, displays....).

Most used technologies include GPS, GPRS, DSRC-interface according to the CEN DSRC/EFC standards that enables migration from, and interoperability with, existing DSRC based charging systems

**Main applications:**

*(referring to urban logistics field)*

Integrated distribution management systems can be used by small or large service providers offering all services related to logistics and/or by huge companies managing directly all processes, from warehouse management to transport of goods from/to different sites involved in production and distribution.

In urban areas, these complex systems could be used both by service providers and Distribution Centres managers, to optimize logistic operations, from goods reception and storage, to packing and deliveries.

Use of integrated distribution management system, would lead to a visible congestion and pollution reduction in urban areas, by increasing number of deliveries per time slice, length of trips and fuel consumption.

**Use and results of applications done:**

*(analyse the experimentations done by cities with special regards to European programs ( i.e. FP7 funded projects, Civitas and other)*

Among those project related to freight distribution and urban policies, different experiences regard also the development of an integrated distribution management system or its sub-systems.

SUGAR project, part of INTERREG IVC Programme, highlighted the limited application of ITS systems in urban freight transport management, and it means a few technologies included in an integrated distribution management system have already been applied in most of cities. So far, the most common policies/technologies used are enforcement (through ANPR), VMS for real time info, lighting management and e-toll: the latter one can be considered related to integrated distribution management system, because it requires use of OBU.

CVIS project, aiming to create a unified technical solution to allow communication between vehicles and Infrastructure by using an open infrastructure on board and on the road, demonstrated through a specific test in London: 8 freight companies were able to make reservations via an Aeb interface for loading and unloading bay use and each participating vehicle was fitted with a CVIS onboard and it led to a visible increase on transport indicators and freight distribution management.

Freight 4 All, a project financed by the European program for territorial Cooperation MED 2007/2013, aimed at tackling the fragmented functioning of transnational multimodal freight transport chains by providing an interoperable and distributed ICT solution. Even if not specifically related to urban freight distribution, the project involved different stakeholders including those operating in urban areas. Expected benefits (achievement should have to be measured after evaluation activities) are:

- foster and improve the cooperation among the business actors involved;
- create and enhance the integration of the different IT systems along the transport chain;
- improve the service performances of the whole transport chain and of each one of the service provider involved;
- reduce the time needed for the transactions;
- offer the accessibility to transnational service providers systems;



- exploit the backend capacity and the service providers capacity, by extending their “area of influence” through the F4All platform

Lucca CEDM is a project part-funded by the EC under the LIFE Environment initiative that started with a background of different completed project, was aiming to define a set of Regulatory, Organisational, Operational and Technological measures to improve efficiency of freight distribution in city centre. The project led to a visible increase in distribution efficiency, thanks to the implementation of an IT platform useful to offer and manage services to all stakeholders, interoperability (B2B, B2C) and accessibility of information and data, better management of fleet and easier controls (loading/unloading bay occupancy)

In Verona, a system based on ANPR and RFID technologies allows to control entrances/exits to/from downtown supporting local Authority to verify respect of windows time for freight distribution and duration of commercial vehicles presence in Limited Traffic Zones. A similar project is going to be developed in other Italian cities.

#### **Perceived potential:**

*(describe the potentialities of the analysed topic in terms of future applications, impact on the process, innovation, etc.)*

An efficient management of freight distribution could lead to efficient logistic processes (better service provider performance), a better quality of services (higher customer satisfaction) and a better quality of life especially in urban areas (congestion and pollution reduction), offering Public Authorities the possibility to adopt a wider range of possible policies and to easily control their respect and efficiency.

It seems that just a few cities implemented an integrated solution, so future applications could be reasonably interesting for urban areas, even if it requires participation of a large number of stakeholders, accepting to adopt technologies and to agree with specific policies/urban distribution schemes.

This “perceived potential” analysis refers to the possible development, integration and implementation of all the different sub-systems of an integrated distribution management system: if limited “only” to some part of it, could be useful but wouldn’t allow to achieve the same results.

#### **RTD activities in progress**

*(describe the RTD activities in course, or the possible envisaged RTD needs)*

While with regard to the software management platform used to collect and manage data and info (warehouse stock and replenishment, driver behaviour and vehicles performance, deliveries and billing/invoicing) it seems that RTD is now focus on the optimization of existing solutions, different RTD activities are in progress with a more specific interest in ON interoperability of and communication between hardware, software and communication tools/devices.

RTD is now really focused on V2V (Vehicle to Vehicle) and V2I (Vehicle to Infrastructure) that involve development and use of On Board Units, part of an integrated distribution management system. The final goal, is to define shared and agreed protocols and procedures in order to optimize data collection, transmission and use for different purposes by a variety of stakeholders, including transport service providers (MTO, shippers and intermediaries) and Public Authorities and distribution, guarantee interoperability of activities and processes and complete integration of software/hardware products used.