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)

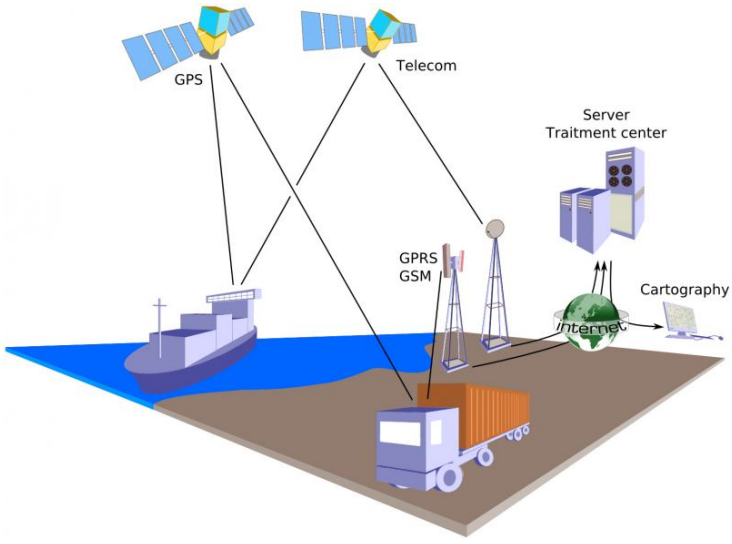
Specific technology/solution: *Fleet management system*
(please refer to the general tech matrix developed under 1.1 task each partner for the allocated technologies)

Description of the technology/solution:

Main architecture of most developed fleet management systems includes generally a GNSS tracking system, combined with data transmission tools as for example GSM or GPRS: possibility to expand the system to other devices and software both on vehicles and on the central server can lead to collect and analyze more data related to the fleet management.

The combination of these two main components, allows to collect and transmit data about position of vehicles, trailers, goods or personnel but, thanks to the possibility to implement different sensors, can be used to collect and receive even real-time information about activities completed or in progress, vehicle's status, drivers behaviour and many other.

All advanced solutions could be integrated in already existing software platform and/or connected to different tools as for example digital maps, used to define best routes, and a wide set of applications/tools can also be installed on any hardware support, including central server/pc, mobile phones and tablet and On Board Units.



(Source: http://www.navipedia.net/index.php/File:Geolocation.png)

Information collected by the GNSS system can be stored locally or transmitted to a central server, in real-time or according to preselected options (every 10 minutes, when a certain situation occurs, on-demand). Information about position of vehicles, goods or personnel could be accessible through a Geographical Information System (GIS) and visible on a map to all authorized users: from logistic managers interested in optimizing processes, to customers allowed to verify anytime the situation/position of their shipments.

Main components of a fleet management system are:

- Hardware:
  - On board computer to collect all data from different sensors and GPS
  - GPS receiver
  - Fuel flow meter
  - Trailer tracking
  - Communication module
  - Driver keypad
  - other devices (printer, RFID/bar code terminals…)
- Data transmission: GSM or SMS modules if real time info are required, otherwise data could be stored locally and downloaded/read at the end of the trip. Data transmission could be arranged in different ways, including communication options (text, voice…) and data to transmit (vehicle/trailer/goods location, activities completed, fuel consumption, traffic status, route recommendation and many others)
- Management software: the software collecting, elaborating and presenting data (all or some) to people having access to different data according to “fleet manager” decisions

Due to the necessity to improve efficiency of business, Fleet Management Systems have been developed in recent years and, starting from a “simple localization of vehicles” they allows nowadays to collect information about:

- real time vehicle/trailer/goods/personnel tracking and tracing
- fuel consumption and emissions
- activities in progress/completed (doors opening/closure, stops, deliveries...)
- driver behaviour (driving hours, speed...)
- respect of laws/regulations (speed limits, access to restricted areas...)

- vehicle's maintenance program and scheduling
- engine/vehicle performance/conditions and possible alarms (temperature...)

Fleet management Systems include also on board units with different functionalities: analysis of the state-of-the-art of these Units and their role in the R&D, is part of a specific document.

PSI (http://www.psilogistics.com) offers a complete solution: Fleet Control provide information about current situation and enable controlled interference in processes. Main modules include:

- Tracking and tracing of vehicles using the Internet, including information about
- Dispatching is informed about the current situation in the transport network with detailed information per vehicle: identification, number plats, date and time of the last position report, time since the last position report, current location, and so on
- Operational alternatives: in-house (a location with communication via the Internet) or hosting (several locations)

Another interesting solution is offered by by EDT E-Drive Technology (www.e-drivetech.com), that offers a wide range of products to improve efficiency and performance, increase number of deliveries using best routes to ensure on-time service, optimize vehicles maintenance and collecting information about drivers behaviour and work and fleet use. This particular solutions includes a sever-based application for real time vehicle asset and tracking and real time alerts about driver behaviour or vehicle diagnostic.

Main applications:
(referring to urban logistics field)

Fleet Management System is used to increase efficiency, productivity and visibility of transport service providers, interested not only in a better management of internal resources but also in customer satisfaction and environmental respect.

Main application of Fleet management Systems regards:

- improvement of fleet efficiency, increasing number of services and reducing delivery time, thanks to vehicle's use and route optimization
- reduction of costs, most of all fuel consumption
- optimization of maintenance program of vehicles, reducing risk of brake down

- improvement of customer satisfaction with faster and on-time services but also with real time information about shipments
- better respect of laws/regulations: driving hours, access to specific areas...
- reduction of risk of theft, by controlling in real time position and route of vehicles, trailers and goods

All this aspect could be referred to urban freight distribution and, in particular, could be useful to reduce congestion (optimizing routes and increasing deliveries, leads to reduce number of vehicles and their travelling time n urban streets), to reduce pollution thanks to fuel consumption real time control and to respect regulations (limited downtown access, limited parking time for loading/unloading...)

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)

Different researches and studies have been completed with regard to urban freight transport optimization and in more or less direct way interested the fleet management.

Among those projects related to fleet management (so excluding green/low emission vehicles, policies and regulations) an important case study and application regards the City of Malmoe: within the CIVITAS program, between 2004 and 2005 AB transporter adopted on board GPS devices on its vehicles to evaluate effects of a Fleet Management System on freight distribution in urban area. Results confirmed an increased efficiency of the service measured by a reduction of travel length, percentage of unloaded vehicles and emissions and by an increase of the number of deliveries per day: all this goals could be important for efficiency increase of SME, most of all for their possibility to support sudden change in services demand.

1st November 2013 is the starting date of OPTICITIES, a project co-funded by the European Commission within the Seventh Framework Programme (FP7), aiming at increasing mobility in urban areas, by sharing information and giving possibility to access this information by all users and stakeholders and, in particular, improving also urban freight navigator systems: the latter target aims to give freight transport providers the possibility to access easily to a huge set of real time information and forecast about most important mobility indicators in urban area.

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

Fleet management system could be used both from transport service providers, in order to increase efficiency and productivity, reducing resources allocated to the distribution process and, in particular, to products delivery/collection in urban areas (first and last mile). In this case, flexibility of solutions, offering the possibility to be customized according to local rules or road network, fleet dimension and technical characteristics, but most of all variable transport service demand, could be an important issue.

On the other side, fleet management system and, in particular, real time monitoring of vehicles position, could be important for Public Authorities to verify respect of existing distribution schemes/policies and/or to define new possible regulatory interventions as time windows access for freight, duration of trips within restricted zones, predefinition of routes for delivery/collection of goods in specific area, freight parking bays management or emission-related road charge. Public Authorities could be find it useful to adopt both a "political" and a technological solution, asking stakeholders operating in urban areas to install on their vehicles some device (OBU, RFID cards) where some specific information that could be automatically detected should have to be located.

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

Continuous development of existing technologies are observed, in different directions more or less directly related to freight fleet management: international cooperation to create a shared system of data collection and distribution could influence also fleet management systems, while navigation systems linked to real time traffic information systems (traffic flows, congestion, parking bays occupancy...) and/or V2I OBU devices could be used to improve efficiency and utility of these systems.

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