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 UCVin 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/University**
		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, SmartsetBestfact etcetera. Moreover the availability of advanced products and solutions on the market should begenerally 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:**Automatic warehousing systems and handling systems**
(please refer to the general tech matrix developed under 1.1 task)

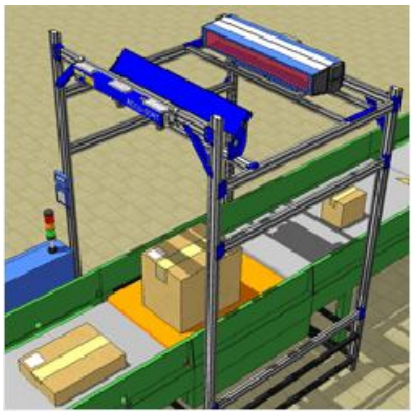
Specific technology / solution:*Automatic weight / dimension measurement equipment*
(please refer to the general tech matrix developed under 1.1 task each partner for the allocated technologies)

Description of the technology / solution:

The weight and the dimension of the packages, that flow inside a warehouse or in a general service factory, are checked with machines that implemented both the functions or by machine that is dedicated to a single activity; another import aspect is the fact that these technologies can be integrated in an existing conveyor system or in a standalone machine.

The evaluation of the package characteristics (dimensions and weight) is a very important factor in relation both the store procedures inside the warehouse and for the cost optimization/ evaluation at the shipment time.

For example the Dimension Weight Scan (DWS) solution, provided by DATALOGIC, is an integrated solution that compose a single record of information that includes at the same time the dimensions, the weight and the bar code scanning: these information can be used for the cataloguing , the sortation or the verification operations.



Dimensions Weight Scan from DATALOGIC (source http://www.datalogic.com)

The laser scanning is the solution that allows the evaluation of the dimensions (the space of cargo that a package occupies); in general the system utilized a single laser scan that enables a unique digital signature for each package: it allows a 3d mapping of the size, the dimensions and the geometry.

Speaking about thelaser system dimensions check it important to introduce the concept of dimensional weight: with the length, the width and the height is possible to calculate the theoretical weight of a package. The latter is the weight of a package at a minimum density level chosen by the freight carrier.

For the dimensions evaluation of package in movement, the more diffuse solution with the use of conveyor, it necessary a specific technology “the profile scanner”.

Profile scanner (source http://www.itsuk.org.uk/volume_and_weight.php)

Whereas the solution, that can be implemented in a conveyor, for the weight check of a package in movement is the in-line scales:

In-Line scale (source http://www.conveyorinstallations.com/In-LineScales.html)

The below image focuseson the technologies inside an in-line scale.

In-line scale focus on technologies

(http://www.riversidepapercompany.com/main_files/scale/h170.htm)

In the system there is a platform load cell and steel tube members that are designed to withstand heavy end loading.

Main applications:
(referring to urban logistics field)

The checking of the weight and the dimensions in the urban field is related to the vehicles utilized for the freight transport.

The knowing of the vehicles dimensions it important for the adoption of urban politics that aim to restrict the access to the central part of the city only to the vehicles that respect fixed dimensions.

This factor it strictly related to the possibilities, with the adoption of right access rules, of influence on the traffic condition inside the urban area and moreover in the environmental quality parameters like the air and noise pollution.

This thematic is one of the aim of the BESTUFS project that wants to distribute the best practises with respect the urban freight transport.

At European level there is high attention to the weight of truck; the new regulations are intended to point toward an high weight level because this have positive effects on the number of trips and in the corresponding emissions.

The communication technologies together with the mechanical access gates give the possibilities to project very efficient and customizable plans for the implementation of

access regulation that will take in account the urban design and the environmental conditions.

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

Between the projects that aim to improve the methodologies concerning the evaluation of the vehicles weight there is the TOP TRIAL project; a two years project, starting in 2000. This is financed by the fifth framework program of the European Union.

The project involves four European countries (Germany, Netherlands, Portugal and Switzerland) and has the particular aim to improve the accuracy of weight measurement of the truck loads.At technological level the TOP TRIAL project suggests the use of a minimum of 6 WIM (Weight In Motion) sensors for lane to achieve the desiredaccuracy level in the weight measurement.The European REMOVE project, time period 2004-2006, has the objective to provide a legal framework in which both new and WIM systems technologies can operate at strategic level with the aim to reduce the damage and the danger that is due to overload vehicles.

The different nations due to the importance of the problem have adopted enforcements technologies to address the WIM dimension and weight.

In Switzerland the cantonal police usesdimensional measuring devices,in conjunction with their heavy goods vehicle (HGV) enforcement sites, which rely on laser scan technology.

Switzerland vehicles profile systems (source: Commercial Motor Vehicle Size and Weight Enforcement in Europe)

Concerning other solutions it interesting to report the WIM system technologies that is implemented with success in Slovenia.

Slovenia bridge WIM System (source Commercial Motor Vehicle Size and Weight Enforcement in Europe)

Concerning the application on the dimension and weight measurement, at urban level, it is interesting the solution adopted in the city of Wloclawek in Poland. The measurement was adopted to contrast the fact that about one third of the truck in Poland was overload by 10% to 50%. The overload vehicles increase the road surface stress by a factor by 20 to 200 with the consequence that in general the life time of the road is reduced by 50 to 70%.

The solution adopted concerns the weight in motion system: the specific solution is implemented with the embedment of measuring strips in the road surface.

The strips are able to measure the vehicle weight with a high level of precision. The system measures, in case of overload vehicle, the load in each singular axle and the total weight; at the same time a camera installed over the roadway makes a picture of the vehicle.

The same system is active in many Polish cities, like Wroclaw and Bialystok and the objective is to install 300 weighting point in Poland by 2015.

Weighting points in Wloclawek (source: http://www.eltis.org/index.php?id=13&lang1=en&study_id=3544)

Another interesting project shows how the truck load rate is related to the time necessary to the loading and unloading of the goods and consequently the traffic congestion and environmental pollution. The city of Gothenburg implemented a criteria, concerning the distribution vehicle, for enter in the inner city: a combination of 65% of load factor and the time comparison between stop time and running time. In the pilot project are involved 8 vehicles with a weight over 2,2 tonnes and the restricted area (2km^2)is inside Vallgraven and Nordstaden.

Improving the load rate in inner-city freight distribution/Gothenburg (source: http://www.eltis.org/index.php?id=13&lang1=en&study_id=2304)

Inside the c-liege project of the UE is reported the fact sheet of the Montana Municipality in Bulgaria. In the Municipality there is a law in road traffic with deny the traffic of truck with over 4 tons in the central part of city: in that area it allows to travel only to smaller trucks that have a special permission, released by the local authorities, to travel.

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

The access regulation in the city to the vehicle for the freight distribution is a crucial point.
The access controls on the base of the vehicle dimensional characteristic and the weight go in the right direction and it's important that the administrative rules being more and more supported by the implementation of technological solutions that allowing a more efficiently check.
The solutions like the weighting points and the profile systems (for the vehicle dimensions) represent tools that can help the work of the police and moreover they can have the function to discourage the violation of the rule.
Another aspect, highlighted from the weight check, is the problem of the road safety: surely vehicles that don't respect the maximum amount of load are more difficult to drive and represented a dangerous for the general safety for the road users.
The vehicle load rate it is a parameter that is strictly related to the traffic level and the consequent influence in the air and noise pollution; it' s interesting to note that the load rate has to be at the right level (in some project is 65%) so that the operation of loading /unloading will take a reduce time so that no have influence in the traffic congestion. Nevertheless the load rate and the vehicle dimension don't have to be very low because in this case for the distribution of freight are necessary more distribution trips.

RTD activities in progress

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

The technological solutions available in the market for the weight (in-lane scale) and the measurements (profile scanner) of the objects have find a good application in the urban environment installations: respectively the weighting spots (for example used in the city of Wloclawek) and the profile systems (for example used in the Switzerland).

It interesting to notice that the urban solutions have a structural configuration similar to solutions installed in the warehouse: in the profile system the lasers are over the roadway implemented in a structure like that present in the warehouse and moreover in the weighting point the equipment for the weight are embedded in the pavement like in the conveyor.

A this point the important aspect is that these technologies implemented in the urban area having the support of the internet network technologies: so that the information gathered from the systems can be used in real time by the users of the service (truck drivers) and by the administrative authorities for the activities of controls and for the implementation of new politics for the urban transport of freight.