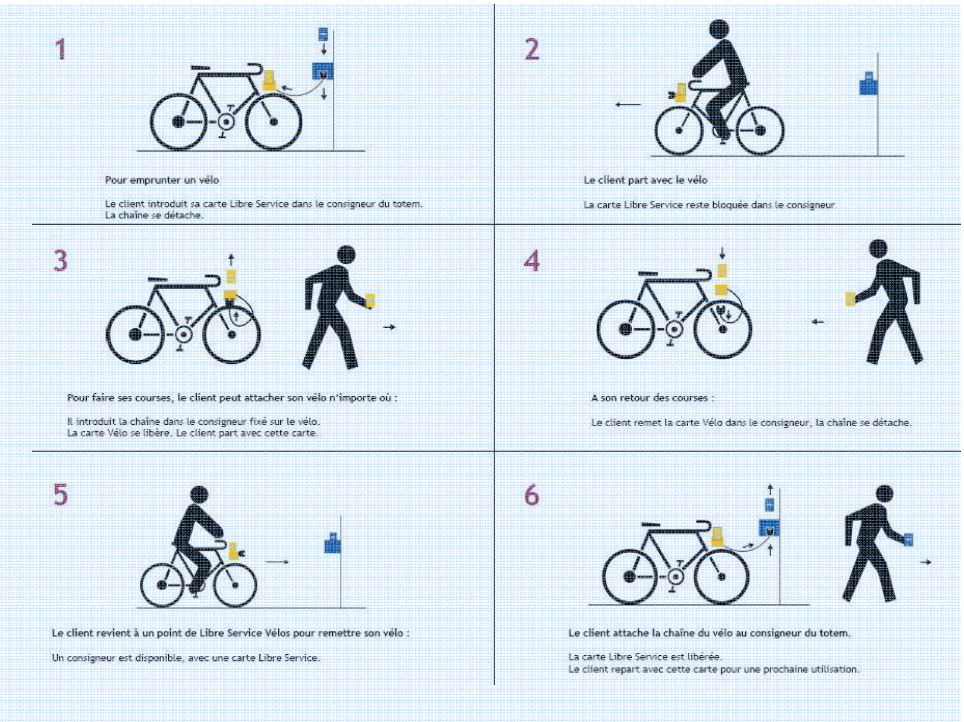
CiViTAS
Cleaner and better transport in cities

SUCCESS
LA ROCHELLE - PRESTON - PLOIESTI




# BIKE SHARING

*Deliverable 9.1 of the Success Project*

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# FOREWORD

Jean YATES, Emil CALOTA, Denis LEROY

*As senior political representatives of the SUCCESS cities we have been personally involved in the project from its beginnings as a Proposal submitted to the CIVITAS Programme in 2004. We have been honoured to take part in the second phase of CIVITAS and we have been pleased to see how well the plans have been implemented in our cities and how our citizens have benefited.*

*The rich cooperation that has been the hallmark of SUCCESS, both between the cities and between local partners in each city, has resulted in greater understanding and mutual respect between different organisations and different cultures. This will have long-lasting effects that will benefit all who have been involved in the project.*

*We have been pleased to cooperate with the European Commission and the wider CIVITAS family, and have contributed to the CIVITAS Political Advisory Committee.*

*We trust that this document will provide useful lessons for others considering the adoption of measures similar to those that we implemented in the SUCCESS project.*

***Denis Leroy**, Communauté Urbaine de La Rochelle, Vice Président en charge des transports*

***Jean Yates**, Lancashire County Council, County Councillor*

***Emil Calota**, Primaria Municipiului Ploiesti, Mayor*

# SUMMARY

1 SUCCESS PROJECT ..... 1
1.1 La Rochelle ..... 4
1.2 Preston ..... 4
1.3 Ploiesti ..... 5
1.4 DESCRIPTION OF THE WP ..... **Erreur ! Signet non défini.**
1.5 A RENEWED BIKE SHARING FLEET IN LA ROCHELLE ..... 6
2 REFERENCES ..... 16

# 1 SUCCESS PROJECT

SUCCESS (Smaller Urban Communities in Civitas for Environmentally Sustainable Solutions) is a 4-year project, within the European Research and Demonstration Programme CIVITAS II, with 12 partners including local authorities, transport companies, universities and experts from La Rochelle (FR), Preston (UK) and Ploiesti (RO). The main objective of SUCCESS is to demonstrate that, with an ambitious package of mobility and traffic management measures, significant results can be provided regarding sustainable transport and energy policy in small and medium sized cities. SUCCESS addresses technical, social, environmental and economic aspects of an integrated mobility strategy. As a demonstration project, SUCCESS involves extensive investment in the participating cities, along with a large range of stakeholders and integrated packages of demonstration measures. Several actions have been engaged in each city ranging from controlled access zones to biofuels, from real time information systems to alternative modes for transport, from cycle and walking paths to integrated ticketing. In total, more than 50 different projects have been set up involving a large number of stakeholders leading to a very wide scope of sustainable mobility management and implementation.

The main goals of SUCCESS are:

- To demonstrate that vehicles using clean and alternative fuels can be an efficient choice for urban transport
- To demonstrate that, with an ambitious package of mobility and traffic management measures, significant results can be seen regarding sustainable transport and energy policy
- To demonstrate that accession countries, soon to be new member states, can learn from our previous mistakes and contribute to urban collective transport issues, while implementing at the same time actions promoting alternative transport modes
- To contribute deeply to many different related research and assessment activities such as new, all-inclusive training and communication initiatives supporting the project objectives

La Rochelle, Preston and Ploiesti represent well the medium-sized cities in Europe. Most of medium sized cities are built around an historical city centre. This city centre is quite often rich with several types of shops as well as craftsmen and small industries, with other commercial or tourist areas scattered around in the city. Commercial and industrial zones have grown up in the surrounding areas and are accessible within a short time.

Regarding transport, the main characteristics of such cities are their small surface area, the human size of relationships and their small investment capacity. Buses often provide the main form of public transport.

Medium sized cities generally have a low demographic density, with the population often spread over a large area, sometimes in surrounding small towns which are included in the "life zone". On the one hand this means short travel times, good accessibility and freedom for travelling, but on the other hand it makes collective transport very difficult to organise.

In such cities, relationships between citizens and between citizens and politicians are closer. The proportion of inhabitants involved in the city life is quite often higher than in larger ones: through different associations and clubs, inhabitants come to know each other more easily and have often direct access to politicians involved in these motors of the city life. So the city culture is more widespread and is shared by a many inhabitants.

Smaller cities have in general lower investment capacity; this capacity is not proportional to size and it is sometimes difficult for the local authority to raise financial levers to fund projects.

## 1.1 The Project Consortium Cities

**PROJECT CO-ORDINATOR :**

**Communauté d'Agglomération de La Rochelle (CdA), FR**

**PARTNERS :**

**Ville de La Rochelle (Ville de LR), FR**

**EIGSI, Ecole d'Ingénieurs de Génie de Systèmes Industriels, FR**

**Lancashire County Council (LCC), UK**

**Preston Bus Ltd (PB), UK**

**Transport and Travel Research Ltd (TTR), UK/FR**

**Preston City Council (PCC), UK**

**South Ribble Borough Council (SRBC), UK**

**Primaria Municipiului Ploiesti (PMP), RO**

**Regia Autonoma de Transport Public (RATPP), RO**

**Universitatea Petrol-Gaze Ploiesti (UPGP), RO**

SUCCESS

## 1.2 La Rochelle

La Rochelle lies on the Atlantic Coast of Western France. The Urban Community of La Rochelle includes 17 surrounding towns and La Rochelle itself. 160,000 inhabitants live in this area of 20,650 hectares and the total population may reach 250,000 people in summer. Based on a strong maritime heritage with several ports (commercial, leisure, fishing), the economic dynamism of the Urban Community of La Rochelle is the main factor of evolution of the city and the foundation of the urban strategies among which policies in favour of the framework of life and urban ecology (sustainable transport and protection of the landscape) stand in first position.

The Urban Community of La Rochelle has been involved for several years in improving urban transport and more specifically in introducing clean vehicles, developing new concepts for sharing vehicles, bicycles, in implementing Park + Ride, and even starting the "car-free day". Clean transport is not the only environmentally friendly improvement introduced in the town. Other actions have already been started to make the city one of the best in the country for environmental issues. Among these are "master planning" for wind turbines in urban areas, an observatory for air quality (ATMO existing since 1976), coastal protection studies (with La Rochelle University) and littoral management, electric boats for collective transport in the harbour. So SUCCESS is clearly part of the global environmental strategy of the local authority for improving quality of life in all of the city's communal areas.

## 1.3 Preston

Preston is England's newest city – city status was granted in 2002. It has a population of 129,000 plus suburban areas in South Ribble (combined population 250,000). Preston is the administrative capital and largest commercial centre of Lancashire in the North-West of England.

Preston is, however, an ancient place, receiving its Charter in 1179 - its historic Preston Guild is celebrated every 20 years with the last celebration in 1992. Preston has a strong economic and retail base. The area is also on the threshold of major regeneration, which will see a transformation of Preston's inner urban areas. This transformation is community-led with the Council and its key partners giving full support. The Council - in partnership with the private sector - is also working on a multi million pound scheme to redevelop Preston's City Centre through better retail, transport, housing, office, leisure and other mixed uses. Preston's student population is acting as a major catalyst too. With over 30,000 students, the University of Central Lancashire in Preston is the sixth largest and one of the fastest growing Universities in the UK.

Preston is already a UK leader in the field of transport telematics through its involvement in the UK UTMC programme and Lancashire County Council was recently awarded the title of UK Local Transport Authority of the Year 2004. The planned major regeneration of the city centre has created

an opportunity for SUCCESS to support a step-change in the provision of sustainable transport systems within the city.

## 1.4 Ploiesti

Ploiesti City is located in the south of Romania 60 km north of Bucharest, the capital of Romania. Ploiesti is the capital of Prahova County and is located south of the Sub-Carpathian hills and north-west of the confluence point of two main rivers, Prahova and Teleajen. The municipal economy is characterised by a concentration of large and very large businesses. The population of Ploiesti went from 56,460 as indicated by the December 1912 census returns, up to 252,715 in January 1992**.** At the end of the year 2001, the population had slightly reduced to 248,688.

Ploiesti City (5,844 ha) is intended to become the nucleus of a metropolitan area, which will include some nearby villages adding around 70,000 new inhabitants to the administrative area. The road network has a radial-ring structure and extends from the city to the neighbouring villages. The municipal roads comprise over 800 streets with a total length of 324 km. East and West ring belts mean around 5,300 vehicles transit Ploiesti each day.

Ploiesti is situated at the crossing of the European Corridors IV and IX.

Ploiesti is a railway hub providing connections between Bucharest, Transylvania and Moldavia. The city has several railway stations for passenger and goods transportation.

Ploiesti is also an important national and regional motorway hub. The municipality lies at the confluence point of the North-South and East-West axes, respectively at the crossroads of Transylvania-Bucharest (Danube River or the Black Sea) and Moldavia-Oltenia (the sub-Carpathian connection).

The local transportation company RATP, which is municipality owned, provides connections to all areas within the city. The municipal vehicle fleet comprised 193 buses, 62 trams and 10 trolleybuses carrying about 70 million passengers annually.

# 2 LA ROCHELLE

## 2.1 A RENEWED BIKE SHARING FLEET

### 2.1.1 City Context

Let us first be reminded that the bike is a transport mode in itself, particularly adapted for 1 to 3 km travels. A “bike strategy” should be integrated into the global mobility policy and complementary with:

- the parking policy
- the public transport policy
- the walking policy
- the car policy
- the public spaces management policy

A “bike policy” is composed of 3 parts:

- the biker’s security ( cycle lanes, cycle paths)
- the bike’s security (cycle hoop, bike shelters)
- the promotion of the use of the bike, awareness rising (communication supports, organisation of events, new services)

The Urban Community of La Rochelle has long been considering bike as a mobility mode in itself and as a way to improve the liveability of the city for its inhabitants. La Rochelle became involved in 1976 by implementing a public bike rental system known as ‘vélos jaunes’.

Today, in light of our own experience and considering other best practices from European cities, the Urban Community of La Rochelle aims to define how the bike services have to develop in order to answer the new needs of the inhabitants, making bikes easier to use and optimising the management and the monitoring of the systems implemented.

### 2.1.2 City Objectives

The objective is to make bike the first mobility solution for 1 to 3 km travels, alone or combined with the car, the bus, or the train.
3 complementary bike renting services are to be developed to respond to the different needs:

- Bike-sharing

Used for short travels from a station to another and accessible with the regular PT smartcard. Stations are implemented at the transport hubs and the city centre and will be extended to neighbourhood districts and Urban Community municipalities.

- Long duration rentals

The annual or monthly rental addresses the Urban Community residents, the businesses and the students via the travel plans.

- Summer tourists rentals (June-September)

The main objective of this service dedicated to the tourists is to avoid the saturation of the bike-sharing during the summer

These bike services must be **complementary** – between them and with the other transport modes in order to expand the intermodal possibilities; they must be **different** to cover all the needs; they must be user-friendly and **clear** to make their use and comprehension easy.
A new type of bike parking will be proposed: the “Bike shelters”. Accessible with the PT smart card, it will be installed in the main transport hubs and in the municipalities.

### 2.1.3 Achievements

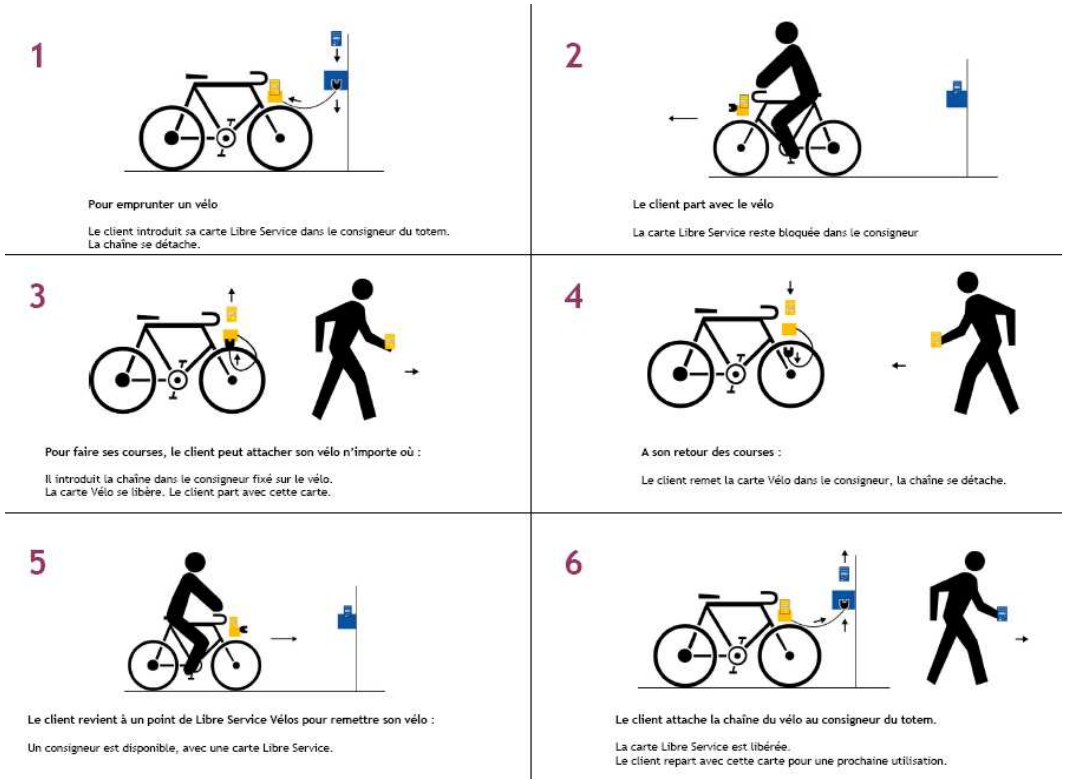
A bike-sharing system has been implemented in La Rochelle within CIVITAS. The bike-sharing system has continuously evolved not only in terms of geographical cover but also in terms of technology. The initial system implemented in 2005 was very simple but presented some deficiencies. It has been automated in 2008 to solve the problems of the first version and its functionalities have been significantly extended.

### 2.1.4 Implementation and operation actions

***First deployment of the Bike-Sharing system from 2005***
The objective was to provide users with a bike service (24/7 timeslot) - notably for their home-to-work or home-to-university travels - complementary to *vélo jaunes* (yellow bike) rental offer.
***Design and implementation of the system***
The system has been designed internally by engineers of the Urban Community. A research project and the realisation of a prototype have been carried out in partnership with Engineers School of La Rochelle (EIGSI). After the validation of the prototype by the representatives of the Urban Community, 3 calls for tender have been launched:

- manufacture the structure
- engineering and implementation
- bikes and card locks

The system has been exploited by the operator of the “Velo Jaunes”; Indeed RTCR had a 30 years experience in the management of the *vélos jaunes.*
***Access to the service***
This service is free for the annual PT subscribers and 50€/year for the others.
***How to rent a bike in a bike-sharing station?***
Card locks are placed in the bikes and in the station. The user introduces a perforated card in the station’s card lock to free a bike. The safety chain is free and the card remains in the support’s lock. There is another card in the bike’s lock. When the user arrives to another bike-sharing station, they insert the safety chain in the lock and receive a card back. It is not the same card they had before renting the bike.




**Number of bikes and bike-sharing stations**

120 bikes were made available 24/7 in 12 stations. The geographical extension was progressive (half in 2005; half in 2006-07). The system has been installed at the main transport and activity hubs (railway station, the universities, the Park and Ride.)

**Main limits of the current system**

Although quite easy to use and to implement for the Urban Community, the initial version of the bike-sharing system turned out to encounter some limits:

- Perforated card proved to be fragile and consequently reliable enough
- Management of the system turned out to be quite difficult as it was not possible to know:
  - Who borrows the bike?
  - When?
  - For how long?

- The number of bikes in the stations in real-time

Some ill-intentioned users noticed the gaps in this simple system and took advantage of it, appropriating the bikes 24h a day and calling into question the essence of a bike-sharing system. Calling the bikes back was not possible as it was not possible to know with certainty who had rented it and when. 11 stations have been emptied.

**Conclusions about this system**

The use of the initial bike-sharing system was based on an "unwritten pact", a bond of trust between the user and the system suppliers. Making a simple system, easy to contract, easy to use turned out to be non relevant. Because of a voluntary misappropriation of the bikes, the system could not operate correctly.

Hence, we could be tempted to pretend that a non automated bike-sharing system is to avoid as it does not allow any control of the bikes. The duration of the rental and the name of the user have to be known.

**Towards a new Bike-sharing system: objectives**

The objective was to improve the initial bike-sharing system: to make it automated for a better exploitation and accessible with the PT smartcard for a total integration in the PT network. The number of stations has been significantly extended: 25 stations in the city centre installed and eventually 50 stations with 300 bikes will be available by the end of 2009.

After the implementation of the systems developed by JC DECAUX, notably in Lyon and Paris, an objective was to offer La Rochelle inhabitants a comparable system in terms of service offered with less operating costs.

**Analysis of the need and launch of the call for tender**

One of the first options taken by La Rochelle decision-makers has been to opt for an 'internal' – i.e. PT operator (RTCR) to manage the operation of the bikes. For this reason, the call for tender has been launched only for the equipment, without the exploitation. Given that the societies who have developed their systems in other cities (mainly JCDECAUX, CLEARCHANNEL, VEOLIA or EFFIA) are more interested in the exploitation, it was obvious that none of them would respond our call for tender. It enabled other societies (non-specialised in the operation) but having developed bike-sharing systems, to present a tender.

Priority has been given to:

- *A system accessible with the PT smartcard*.

For increased ease of use to the user and a better integration in the PT network, the bike-sharing system had to be accessible with the PT smartcard.

- *Real time information about the users and the stations for a better management.*

Essential information had to be collected if we wanted our system to be really used as a bike-sharing system.

About the user:

- Which bike number does the user rent?

- At which hour and station does he take it?
- At which hour and station does he give it back?

About the station:

- Is the station full or empty?
- Which spaces are empty?

Each station had to be equipped with a GPRS modem to transfer the data to a server in the RTCR depot.

- *Stations easy to install and to move*

It minimizes the civil engineering during the implementation.

- *Safety of the stations and the bikes*

Vandalism is a huge problem for a 24/7 service; hence a special attention has been paid to the safety issue, especially on the bikes attachment system and the site structures (solidity of the fixing in the floor, of the smartcard reader …).

- *Solar panels (in option)*

This solution presents a lot of advantages: it reduces the operating costs, gives a more environmental-friendly image to the service and avoids civil engineering to connect the station to the EDF energy network.

The FlexBike company was chosen, based in Montpellier, they proposed a simple and practical system, requiring few road works and maintenance.

***Description of the Flex Bike system***

FlexBike racks are designed for 8 or 4 bikes. With no cables to worry about, the installation of FlexBike racks equipped with the battery and solar power option is easy to install.

FlexBike stations include 3 main components:

1. The frame

The frame is made from stainless steel tubing and fixed with 3 uprights with pedestal base.

2. The console

Each rack is equipped with a rental console which allows the users to access the system and rent bicycles. It contains a GSM/GPRS modem connected to the server, an electronic card reader unit, a LCD screen and a keypad. It has been designed to use as little electricity as possible to allow the use of solar power.

3. The lock Unit

An electromechanical unit locks and unlocks the bicycles. Each lock unit is equipped with an RFID reader which allows identifying each bicycle rented or returned thanks to the RFID chip placed in the tip of the bicycle's lock spike.

The bicycle locking system is compatible with most adult sized bicycles. The lock spike (with a built-in RFID chip) is fixed to the basket-handlebar assembly. This assembly is fitted without the need for welding.

A simple combination bicycle lock (4 digits) is fixed to each bicycle. This allows the bicycles to be parked securely when away from a bicycle-station. The lock's combination code is communicated to the user on the screen of the terminal during the rental procedure.

The units are equipped with solar panels and batteries. They have approximately a one-week autonomy without any other energy supply, with about 15 operations a day. The panel has a 600*500mm area, with a 45° angle, and is south-orie nted. It is fixed on a 2400mm high stainless steel tubing.

**How to rent a bike?**

- Hold the RFID card in front of the card reader zone on the terminal
- Enter the PIN code and press "OK"
- Enter the number of the lock unit holding the bicycle chosen for rental
- Wait a few seconds while the terminal connects to the server via GSM/GPRS to validate the rental
- Note the bicycle lock combination number which is shown on the LCD screen
- Once the lock unit is activated (indicated by a beep), press the unlock button on the lock unit
- Remove the bicycle from the lock

**Validating the rental**

- Before unlocking the bicycle, the rental-terminal connects to the server, the system which runs a number of verifications, notably:
- The validity of the card
- The validity of the PIN code
- Checks that the user holds authorisation to use the bicycle rental service
- Checks that the user has sufficient pre-paid credit for a new rental
- Checks the user has not been blocked (black list)
- Checks the user has not reached the maximum number of simultaneous bicycle rentals allowed
- Checks that the bicycle is available for rental or if it is blocked (for repairs, for example)
- The numeric signature of the bicycle rack

If any of these checks fails, the bicycle will not be released.

**Returning a bike**

The user must choose a rack with an empty lock unit in order to return the bicycle after a rental.

- The user has to press the unlock button beside the attachment point (the lock will open)
- They then insert the bicycle into the unit

- At the end of this process, the rental is terminated with a connection to the server.

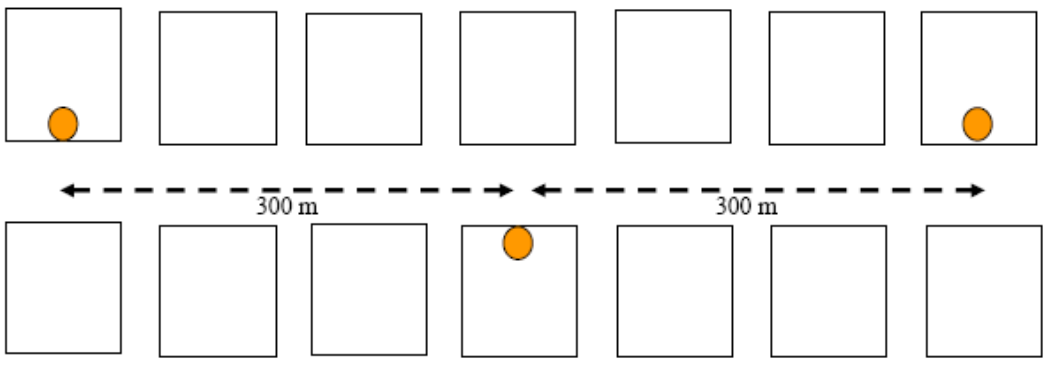
**Test and implementation of the service**

A prototype has been asked to FlexBike in order to validate the system and present it to the Mobility and Transport department and its representatives in the beginning of 2008.

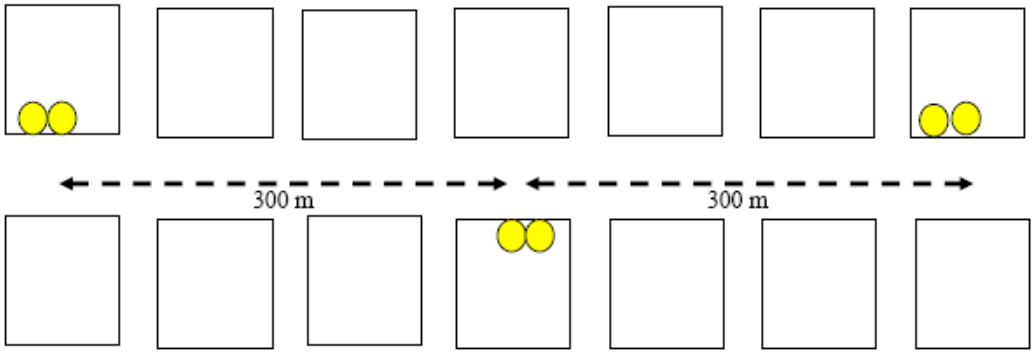
A test has been launched and consequently 3 stations have been installed in La Rochelle city centre and about 20 users have been chosen to use regularly the service, in order to collect their remarks.
In parallel, the operator of the system has been trained in order to ensure a good maintenance and balance of the stations. Indeed, the management of this bike-sharing system is quite different from the preceding one which had encountered a lot of problems on the return of the bikes.
The test highlighted some technical problems in the exploitation (console, non identified bike, and non identified smart card) and in the frame (light instability, especially due to the solar panel).

### *Localization of the stations*

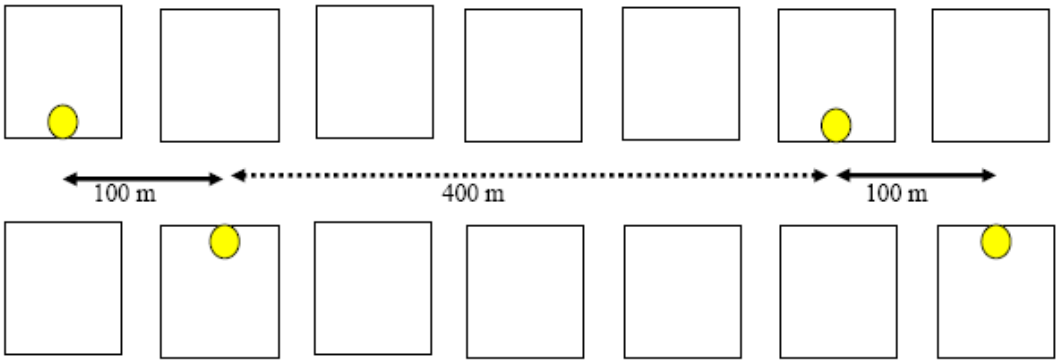
An internal study has been carried out to establish the localisation of the stations. According to the experience of the operators JCDECAUX, VEOLIA and CLEARCHANNEL, the ideal disposition of the stations should be a 300m distance with an offer of 10 bikes.



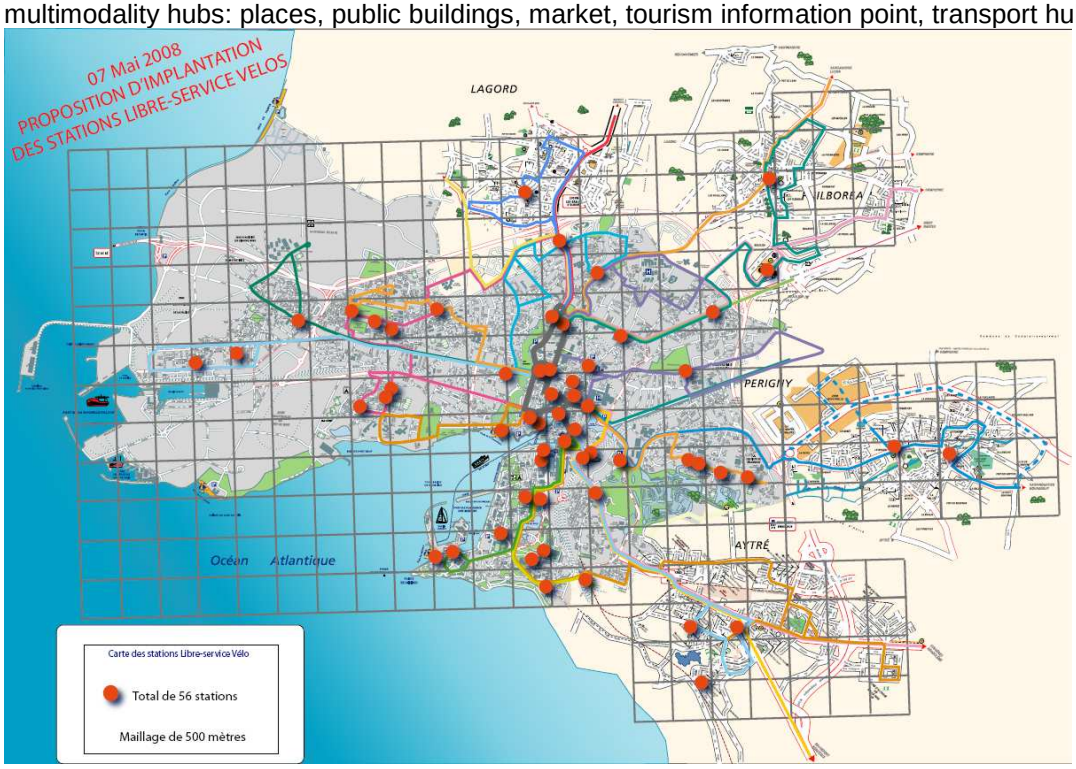

Given the kind of stations La Rochelle had chosen (5 bikes in an 8 racks station), we should have installed two stations each 300 meters.




It was thought about another kind of gridding, more coherent with our system - “double gridding”:




The stations have been located according to this kind of gridding and to the main activity and multimodality hubs: places, public buildings, market, tourism information point, transport hubs…



- Validation with the Association Nationale des Architectes des Bâtiments de France (ABF)[1]

  The ABF had to give its authorisation for the equipment implemented in the public space. It provided La Rochelle Urban Community concrete recommendations related to the integration in the urban landscape. After ABF's validation, the Urban Community worked together with the technical services responsible for the road network (civil engineering, implementation of the stations…)


***Official presentation to the public***

In the framework of France's takeover at the head of the EU, Dominique Bussereau, the French Minister of State for Transport, invited the European Transport Ministers in La Rochelle for a two-day work session on 1st and 2nd September 2008.

In the presence of the EU Ministers, the European Commission, and about 400 invitees, M. Bono, President of the Urban Community, seized the opportunity to present La Rochelle's new bike-sharing system and the new image of the PT network.

During the proceedings, a gift was made of the first "Yélo" bike, which was presented to Dominique Bussereau, Minister for Transport.

### 2.1.5 Conclusions

After the experience of the implementation of the bike-sharing system, La Rochelle draws the following conclusions:

[1] French Buildings Architects Association

- It is essential to have an automated bike-sharing system. Otherwise, it is not possible to monitor the system, the users can keep the bikes and the exploitation is difficult.
- Safety, solidity and reliability are fundamental for a 24/7 system.

# 3 REFERENCES


**General information on Bike sharing systems :**

http://bikesharephiladelphia.org/learn/history/

http://bike-sharing.blogspot.com/

http://www.nybikeshare.org/file_download/1

http://www.epomm.org/ecomm2008/Laurent%20Mercat.pdf

**French bike-sharing's websites :**

JCDECAUX systems:

Vienne : http://www.citybikewien.at/

Lyon : http://www.velov.grandlyon.com/

Paris : http://www.velib.paris.fr/

Toulouse : http://www.velo.toulouse.fr/

Marseille : http://www.levelo-mpm.fr/

Amiens : http://www.velam.amiens.fr/

Aix en Provence : http://www.vhello.fr/

Besançon : http://www.velocite.besancon.fr/

Rouen : http://cyclic.rouen.fr/

Mulhouse : http://www.velocite.mulhouse.fr/

Caen : http://www.veol.caen.fr/

EFFIA system:

Orléans : https://www.agglo-veloplus.fr/

CLEARCHANNEL systems :

Rennes : http://veloalacarte.free.fr/

Perpignan : http://www.bip-perpignan.fr/

Dijon : http://www.velodi.net/

Barcelone : http://www.bicing.com/

CALL A BIKE system:

http://www.callabike-interaktiv.de/kundenbuchung/

HOMEPORT system: http://oybike.com/

Other systems :

Burgos (SP) : http://www.bicibur.es/

Montréal : http://bixi.ca/

Toulouse (old system) : http://www.movimento.coop/

Some cities in Italy : http://www.bicincitta.com/

La Rochelle Bike sharing system : **http://www.flexbike.fr/main/**

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