

# ***Bus Priority System & complementary tools to improve the bus network's overall level of service***



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# Toulouse Metropole & Tisséo Network

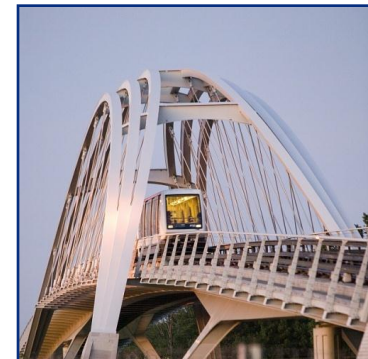
almost 1 million inhabitants  
on an area of 860 km<sup>2</sup>



## The Tisséo Network (Urban PT of Toulouse Metropole)

- 2 Metro lines using VAL System
- 1 Tram line using CITADIS Vehicles opened at the end of 2010
- 66 Bus lines / around 550 buses
- 17 millions of km in 2010

#130 millions of validations in 2010



# Main goal of the Bus Priority

## Improve the competitiveness and the attractiveness of the Bus Network towards the Private Car use

- by improving the commercial speed
- by improving the regularity and time schedule reliability
- by offering a better comfort during the travel
- by reducing the exploitation cost of bus lanes

## Reducing the 'fracture' between the Metro Network and the Bus Network



***For a bus service with an overall travel time of 25 min and a frequency of a bus / 6 min.***

***→ you would need around 9 buses/drivers to operate the service***

***if you reduce from 25 to 22 min the travel time***

***→ you could operate the service with only 8 buses/drivers***

***if you reduce from 25 to 21 min the travel time***

***→ you could propose a frequency of a bus / 5 min.***

# A quick focus on the Bus Travel Time

The overall Travel Time of a bus service is made of :

- Time when the bus is (supposed) driving
- Time when the bus is stopped :
  - at the bus stop : passenger exchange
  - at a traffic junction / traffic light

*Local studies have shown this time lost has a very negative impact on the users' perception of the travel quality.*

To reduce the overall Travel Time, one's need to reduce all of these “times” by :

- reducing traffic congestion
- dedicating lanes to the bus or building segregated infrastructure for bus
- modifying the configuration of Bus Stops
- optimizing the time for the passenger exchange
- treating specifically traffic junctions
- acting on the traffic lights in favor to the bus





# Actions on the Infrastructure (1/2)

The most efficient measure is to create a dedicated lane / infrastructure :

- segregated lane ...  
like for BRT or BHNS concept  
qualitative and costly infra.  
20% to 50% travel time improvement
- bus lane  
difficulty to allocate space  
20% to 30% travel time improvement
- local treatment  
Chronobus approach

But in any case, it will be efficient  
only if respected by other road users

➔ Police Enforcement required

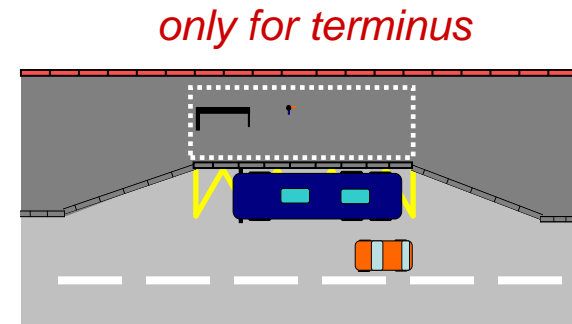
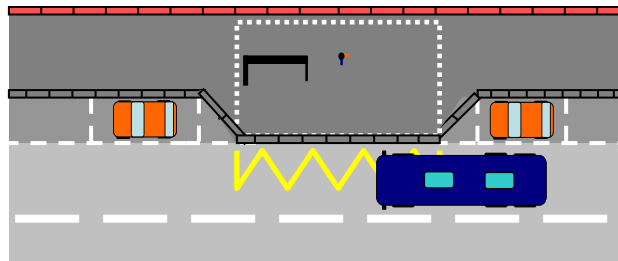
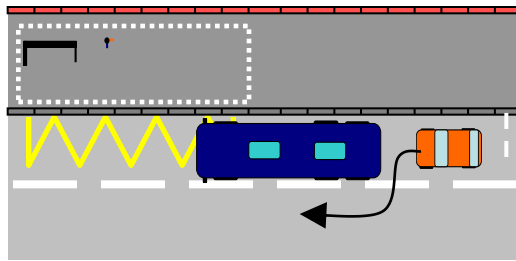


# Actions on the Infrastructure (2/2)

## Basic rules applied in Toulouse :

- road lane width should be at min. 3,50 m on main axis
- road lane width should be at min. 3,00 m on secondary axis
- specific treatment of roundabout and intersection
  - integrating place necessary for the turning movement of buses
- installation of bus stops after traffic junction every time it's possible
- systematically integrates accessibility rules at bus stops level

## Treatment of Bus Stops :



All of these rules are described in a dedicated guideline book  
and systematically applied when road works occurred on bus network.

# Using ITS to reduce buses' travel time

## Traffic Regulation and Congestion Management through a Urban Traffic Control System

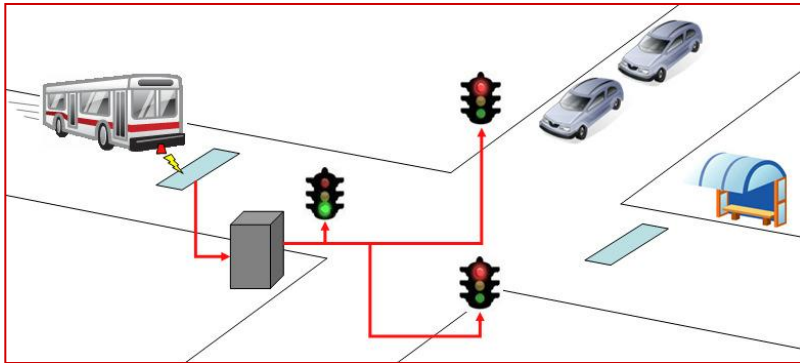
### Application of ITS at Public Transport level :

- **Automatic Vehicle Location system (SAE)**  
that will permit to better regulate the bus network and bus frequency
- **Ticketing system using smart technology**  
in order to reduce the passengers exchange
- **Automatic docking system** (*like Optiguide©*)  
*that will permit to reduce the passengers exchange especially for disabled persons*
- **Traffic Lights' Bus Priority system**  
in order to reduce the time lost crossing a traffic junction equipped with traffic lights



# Bus Priority System, a quick state of the art

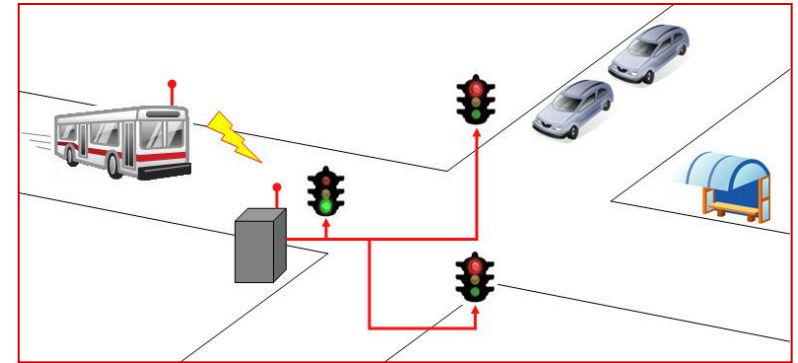
## Most Used Technical Solutions :



### Using Magnetic Detection Loop

Particularly adapted for dedicated infra

Need road works and hard maintenance



### Using Radio Communication

Particularly interesting when buses travelling with other vehicles

Need soft maintenance and tuning

Most interesting results because of the adaptative process !

Similar investment costs :

1500 to 2000 € to equip a Bus

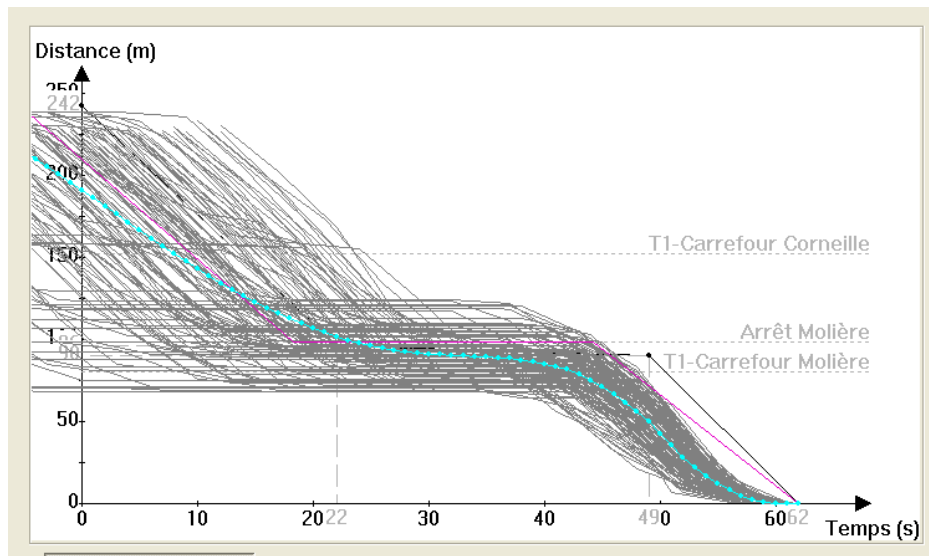
2000 to 2500 € to equip a Traffic Lights Controller



# Radio Com. Bus Priority System – Main Principles

## Solution that relies on :

- the communication between the bus and the traffic lights controller inside the approach area of the traffic junctions (300 to 500 m)
- the collection and the use of historical data that will permit to know the average approaching profile of the bus
- the possibility to know in advance and accurately the time when the bus will arrive at the traffic junction (when Green lights should be given)



***Definition of the Approach Courb***

# Toulouse Bus Priority System – A strategic choice

A 4 years program adopted in 2009 :

- to equip the whole bus fleet (550 buses) with the radio com. bus priority system in order to avoid exploitation constraint to allocate buses to lines supposed to have bus priority
- to treat the “top 10” bus lines of the network
- to progressively integrate bus priority on 150 / 200 traffic junctions
- to progressively replace the loop detection system used on segregated bus infras



Selection of an industrial : COMATIS

Budget of the operation :

Bus & Depot : 1,19 M€

Traffic Lights & Parametring : 1,30 M€

**Total : 2,95 M€**

# Toulouse Bus Priority System – Some results figures

Presently : 6 bus lines equipped  
(should be 8 in the beginning of 2012)

Not all traffic junctions with traffic lights treated  
especially pedestrian one (politic choice)



Average results :

- reduction between **40 & 60 %** of the crossing time
- average save of **50 to 80 seconds** for each bus / each course

Disparate results :

- in the city centre (Boulevard) limited results  
because traffic density, number of buses  
and limited residual time available
- **better results in the inner suburbs / suburbs**



# Toulouse Bus Priority System – In conclusion ...

After 1 year of system exploitation (of 1st lines equipped) :

- a system that needs time to be optimized and requires a permanent follow-up
- a quite efficient solution for dense traffic area ... but won't do miracle ! used to convince decision makers to invest on infrastructure
- a technical solution that also permits to better understand the traffic flow and identify traffic “black spots”
- a project that permits to develop exchanges between bus operators and traffic managers



Thank you for your attention !

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