

# Tram on Wheels

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# Systra S.A. – world leader in urban and railway transport engineering

Our teams support our Clients in all project phases:

- ✓ Advice and Expertise
- ✓ Civil engineering and project service
- ✓ Organisation, planning and coordination of all Client's projects
- ✓ Training, technical support in maintenance and exploitation



**Trams, tram-train, Automated Guideway Transit, Bus Rapid Transit, metro, High Speed Railway, Conventional Railway**

# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

In 2001 the Union of Public Transport (SMTC) appointed SYSTRA to provide assistance to the owner:

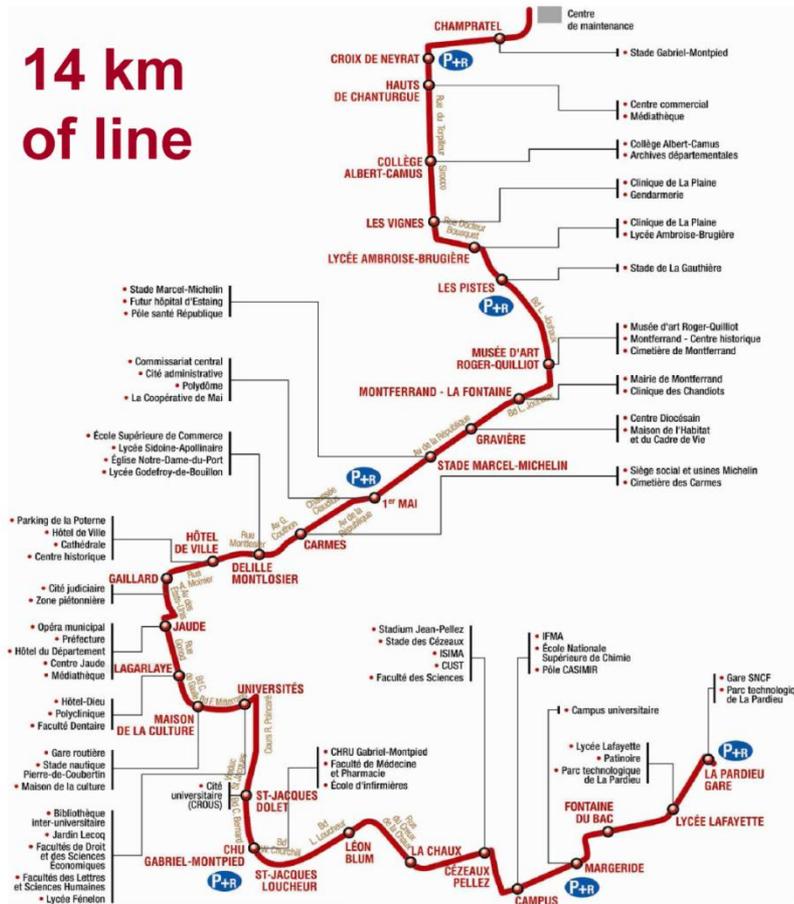
- ✓ drafting of tender documents and the analysis of bids for the system contract
- ✓ preparing specifications for the choice of project manager
- ✓ definition, supervision and inspection of contracts, and drawing up applications for authorisation (DUP planning consent, licence application and grant application documents etc.)

SYSTRA also had a general, organizational role, providing technical advice, particularly with regard to the implementation of safety procedures.

# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

14 km  
of line



- 31 stations
- Operates from 5 AM to 1 AM
- 45 minutes of distance from terminal stations
- Traffic priority

Bonuses:

- 9 km of additional bicycle lanes
- 6 Parks and ride (P+R)
- Several Poles of intermodal exchanges

# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

Translohr vehicles:

- Length: 32 m
- 4 segments vehicle
- Width : 2,20 m
- Height : 2,95 m
- 70% of glazed surfaces
- Low integral floor : height 2
- Electric
- Capacity : 225 people
- 4 segments vehicle



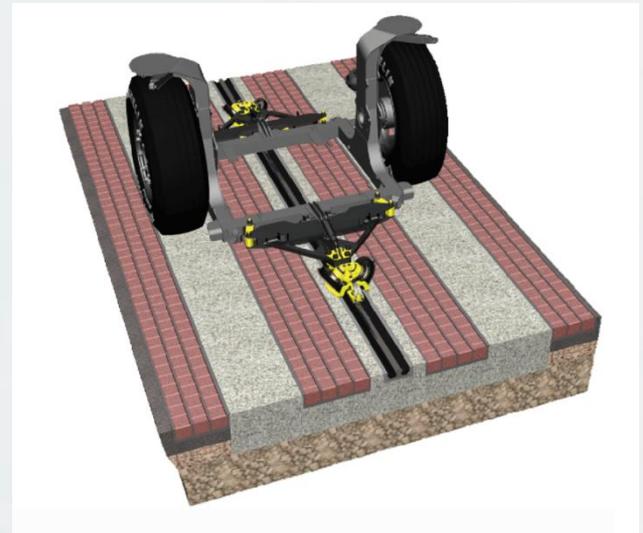
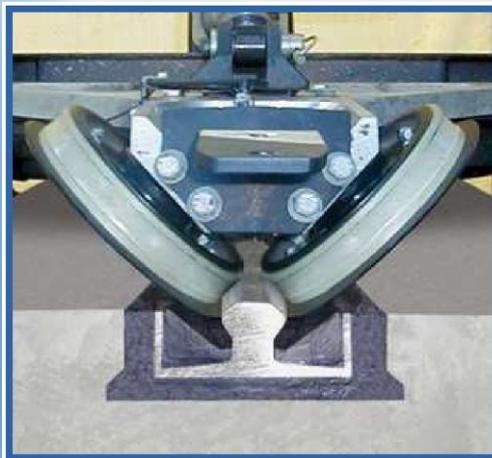
- Accessible to all

# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

A single rail of guidance

- The rollers grip the rail : underailable
- The rail is drowned in the resin : neither vibration nor squealing
- The rollers are covered with a composite binding : no contact iron onto iron
- Continuous guidance including in the center of maintenance



# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

The Tyre in addition

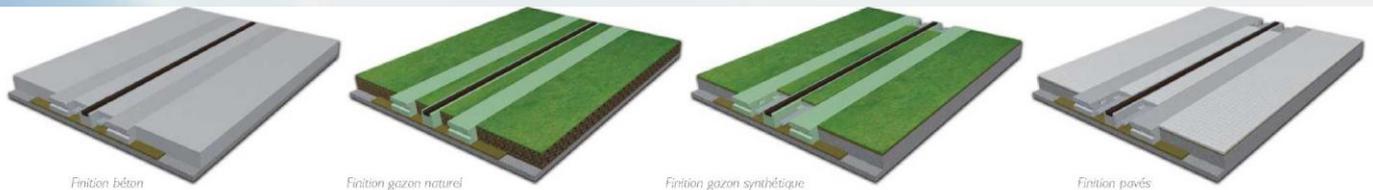
- silence
- better adhesion
- flexibility
- natural suspension
- easy maintenance



# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

- Possibility of choosing prefabricated beton slabs.
- Possibility of choosing grass covering or beton covering – allowing bus and cars circulation

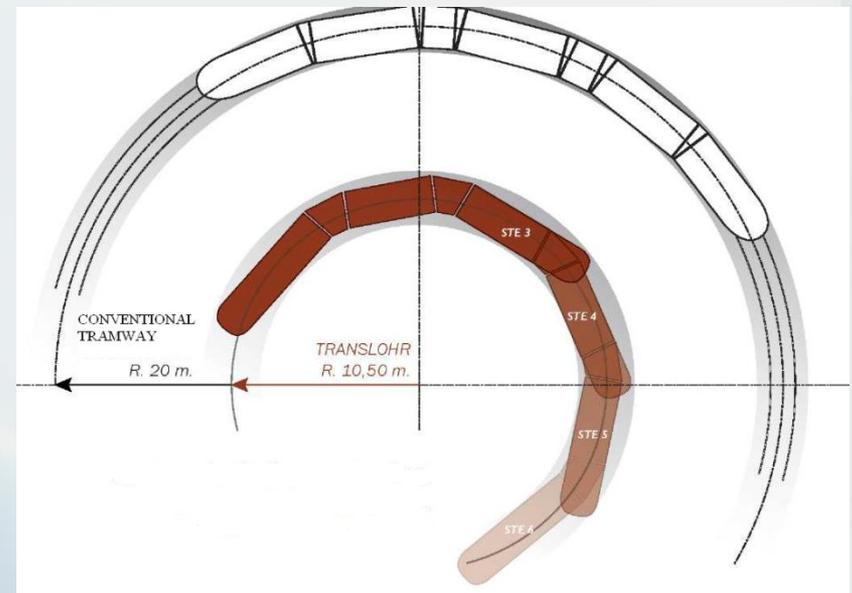


# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

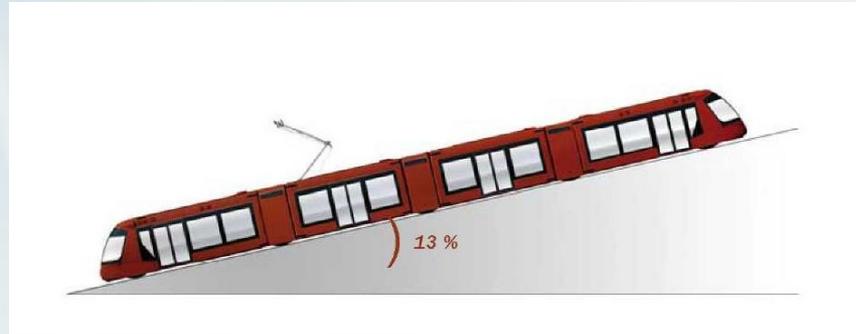
### Advantages:

- The Translohr presents a very short rail turning circle (10.5m whatever the vehicle model), this feature enables a particularly easy urban insertion in the narrow streets that impose tight angles.



# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

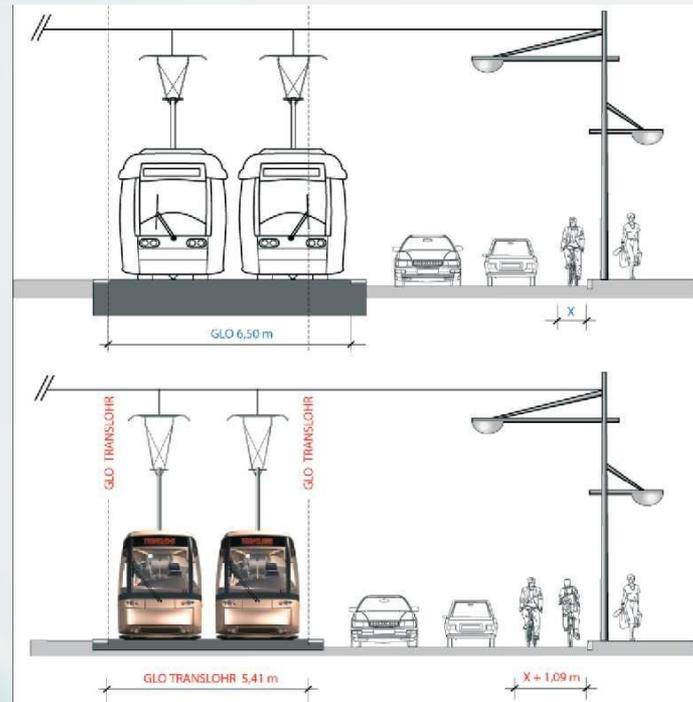


- Thanks to its motorisation and its tyre adherence, the Translohr can run on slopes of 13%.

# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

- Uses minimum of ground surface.  
5,41 m instead of 6,50 m.



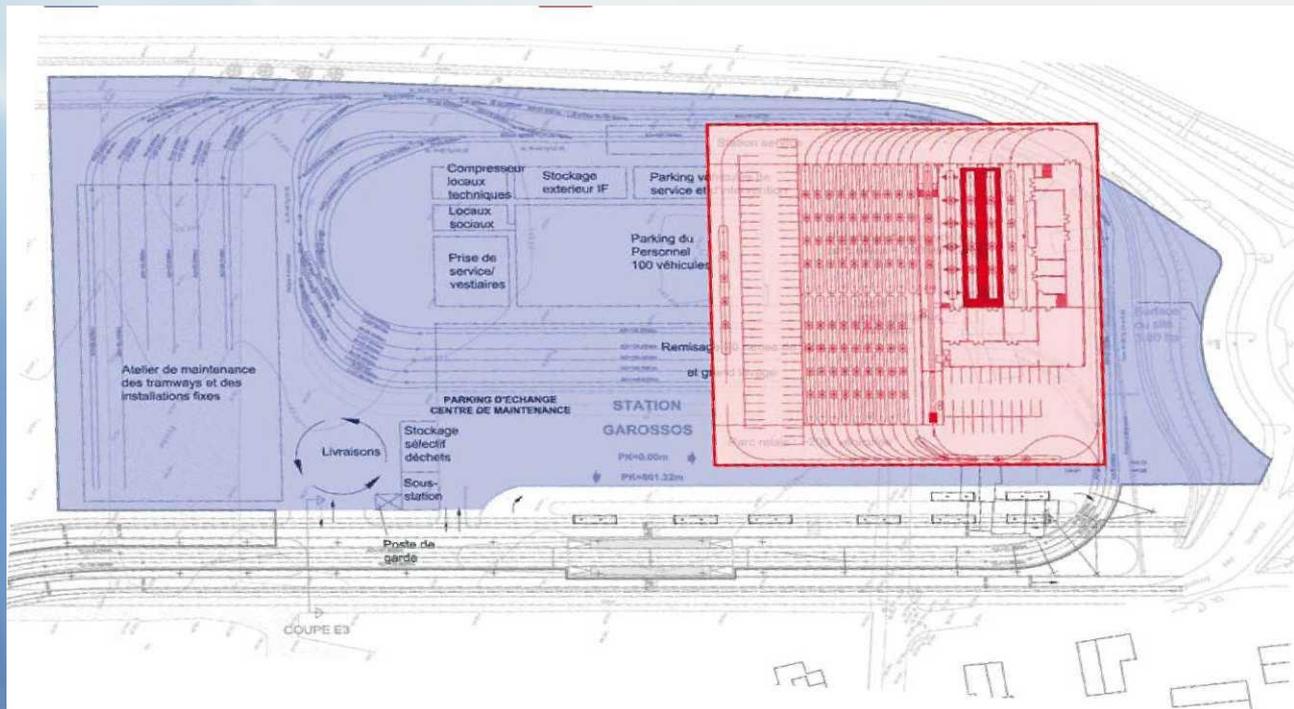
# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

Transport mode which requires less space for depots than a conventional tram.

Tramway traditionnel (25 000 m<sup>2</sup>)

Translohr (10 000 m<sup>2</sup>)

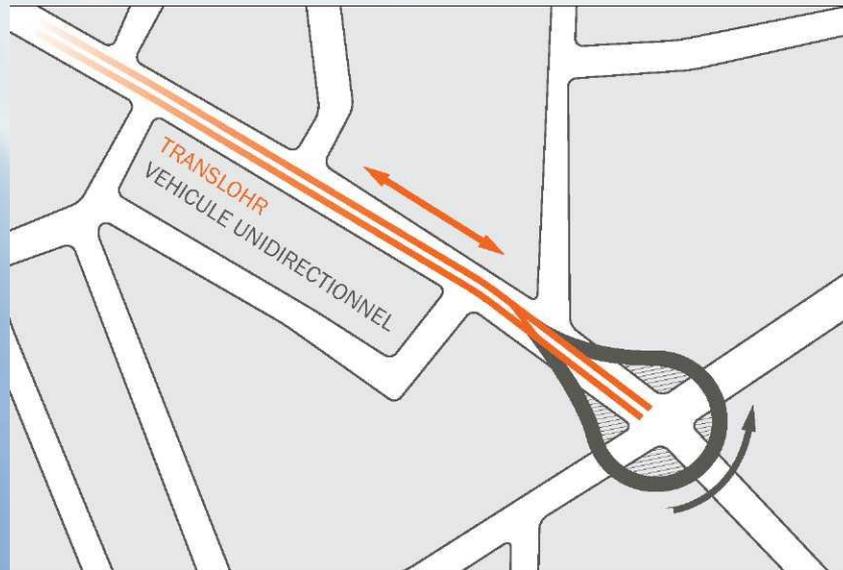


# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

- Bidirectional

Equipped with a driving cab at both ends, Translohr vehicles are bidirectional. This feature enables to operate the vehicles without a reversal ring at the end of the line and without requiring the use of dead-end track depots.



# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

- Improvement of the air quality
- Reduction of sound pollution
- New share of public space



# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)



# Cost and financing of the project

Cost and financing of total the cost project of the project 290 million € (value Euros 2002).

## Financing

Three banking conventions with the European Investment Bank (30 million Euros),  
The Case of the deposits and consignments (32 million Euros)

a banking pool composed by

- Dexia Crédit Local,
- The Crédit Agricole Centre France
- and the Caisse d'Epargne d'Auvergne et du Limousin (140 to 200 million Euros).

## Subsidies

20 million Euros of FEDER (Regional European Development Funds).

a financial assistance on work of infrastructures, the studies and the travelling material

6 + 12 million Euros of the State (instead of the 64 million Euros considered),

15 million Euros for each local authority : The regional Council, the General Council and Clermont Community

# Trams on wheels solution

## CLERMONT-FERRAND (FRANCE)

- Innovative and ecological solution reducing noise and air pollution
- Comfortable transport mode, accessible also for disabled people
- Transport mode requiring less space to run, to turn and to reverse directions, easier to insert in the city

# Tram on Wheels

**THANK YOU FOR YOUR ATTENTION**