

**Place**  
**Project**  
**Contractors**  
**Project manager**  
**Operator**

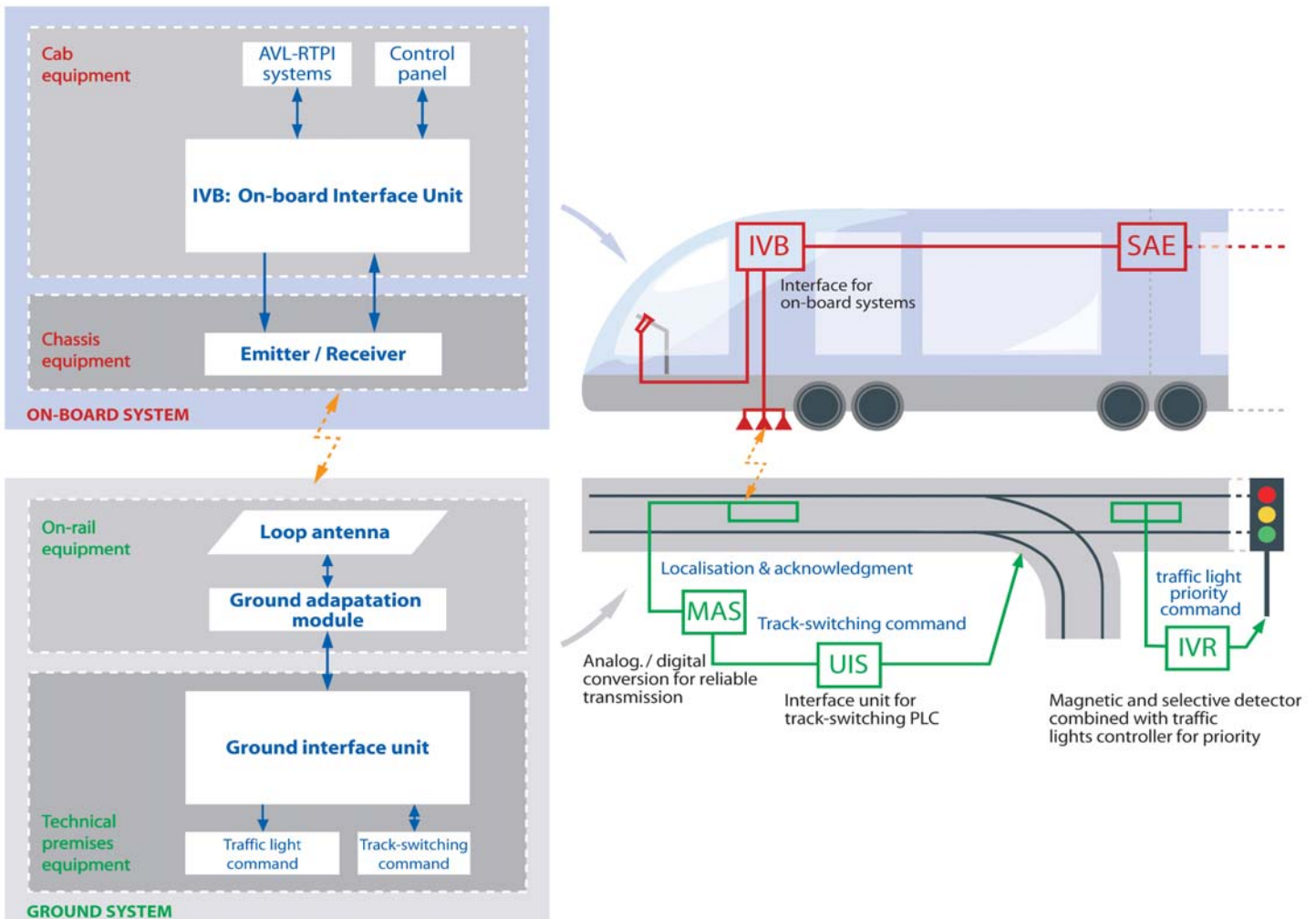
Grenoble, Isère, France  
3rd tramway line  
SIAS : Semaly, Ingerop, Attica, Sogreah  
SMTC (Line operator)  
SEMITAG (Transdev group)



## Specification

- ✓ Optimization of the network average speed : 53 Alstom TFS tramways for the existing lines (rétrofit operation), 35 Citadis tramways for the additional lines .
- ✓ One system for traffic light priority, track-switching command and localisation : 250 detection points for traffic lights priority (short and long distance detection, confirmation and acknowledgment loops ) , 40 track-switching commands.
- ✓ Easy interface of these functions with the other equipments : rolling stock (Alstom) , AVL-RTPI systems (IneoSystrans), Railway road marking (Forclum), road infrastructure (SEA and Lacroix Traffic)
- ✓ Former lines upgrade (on-board and ground equipments)
- ✓ Tender in 2003, beginning of deployment in 2004, inauguration in May 2006.

## Cap'System 3 In 1 : Up to 3 functions depending on spécifications



Realistic technical innovation for traffic control

# Main advantages of Cap'System 3 in 1

## ☺ Interface cost optimisation

Flexible solution including interfaces with the other equipments

**IVB (On-board interface unit)** : includes both traffic lights priority and track-switching commands (interface with AVL-RTPI systems and push buttons of the control panel).

For the ground system, 2 interfaces are available: **IVR** for priority order to the traffic lights controller, **UIS** for track-switching command

For Grenoble project, Capsys capacity to interface its system to the other ones has been a key factor.

## ☺ Modularity

A system made of different technological bricks that can be therefore adapted to every specific customer's request :

**Mono-directional transmission** (on-board / ground) for traffic light signalling and / or track-switching command,

**Bi-directional transmission** (on-board / ground and ground / on board) for high level applications.

## ☺ Upgradeability

For numerous line extension projects, the necessity to upgrade the already-installed systems is key in project management.

Thanks to an on-site software upgradeability, Cap'System can increase the numbers of functions both on the on-board and ground system.

## ☺ Flexibility

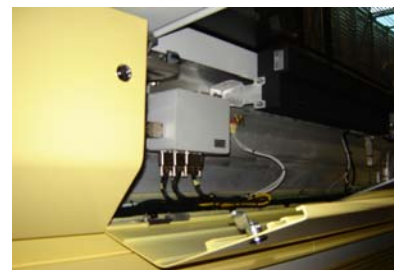
The loop-antenna undertakes numerous operating modes. The confirmation of the traffic lights priority order is acknowledged only when the tramway leaves the stop.

The non-equipped priority vehicles (ambulances, firemen, taxis...) driving on bus lanes can be detected on the Highways department request.

In damaging functioning mode, the magnetic mode allows to reach a minimum speed.



Track-switching command panel



IVB interface



IVE redundant emitters + IVF receiver



IVR connected to the traffic lights controller

## Operating principles

**Traffic lights Priority** : the IVB receives the line identification emitted by the AVL-RTPI system. Then, it gives a priority code transmitted through the IVE beacon fixed under the tramway. The loop-antenna is used as a receptor and transmits the message to the IVR ( interface with the traffic lights controller) in order to speed up the green light for the tramway.

**Track-switching command** : on-board / ground order activated from the cabin and going through the IVB, the IVE ( transmitter), the loop-antenna and the ground-adaptation module (MAS) up to the ground interface unit UIS (interface with the track-switching PLC) In bi-directional mode, an acknowledgement order (ground / on-board link) is transmitted to the driver.

**Localisation** : ground / on board information which gives an address in digital format to the AVL-RTPI system in order to manage the localisation.

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