

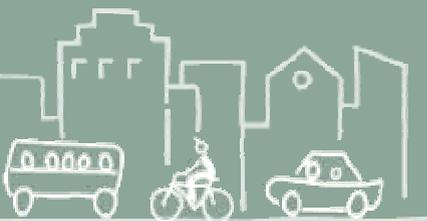


“Multi-operator real-time information for bus passengers in metropolitan Barcelona”

Technical workshop B3 Civitas Forum, Nantes

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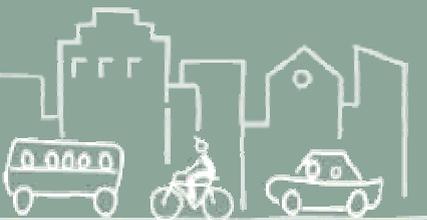
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*AVM = Automatic Vehicle Monitoring



Introduction : RMB

RMB (Metropolitan Region of Barcelona): 164 municipalities with a surface area of 3,200 km² and a population of more than 4.3 million inhabitants.



THE CIVITAS INITIATIVE IS CO-FINANCED BY:



The Metropolitan Transport Authority (ATM) is a consortium of administrations created in 1997 which coordinates the collective public transport in the Metropolitan Region of Barcelona (RMB).

The collective transport network that operates in the RMB is made up of 41 public and private operators. 3 of them are rail transport (Metro, FGC, Cercanías RENFE) and 38 are bus transport within different authorities (TB, EMT, DGPT, other local urban authorities).

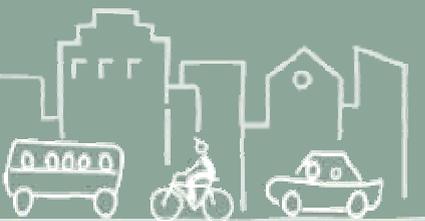
There is a common Fare Integrated System managed by the ATM, that permits transfers on up to four different RMB operators, without any additional cost.

MIRACLES Measure 7.2 was conceived as an integral part of ATM's Guides Plan project

Scheme objectives

To promote more integrated passenger information at the metropolitan level, the objectives are:

- Acquiring and implementing a common AVM (Automatic Vehicle Monitoring) system for the 20+ private medium bus operators active in the area,
- Processing information from the AVM and other information sources and emitting messages about the arrival times of next buses via display panels at certain stops
- Interchanging information about the location and arrival times of buses from this system and those of the main Barcelona bus operator (TMB)
- Installing information panels at 4 stops, selected to promote bus – tram interchange.





- ◆ Some of the operators of the ATM have fleet operation support systems like CTC for the rail transport and AVM for the biggest bus operators (e.g TMB).

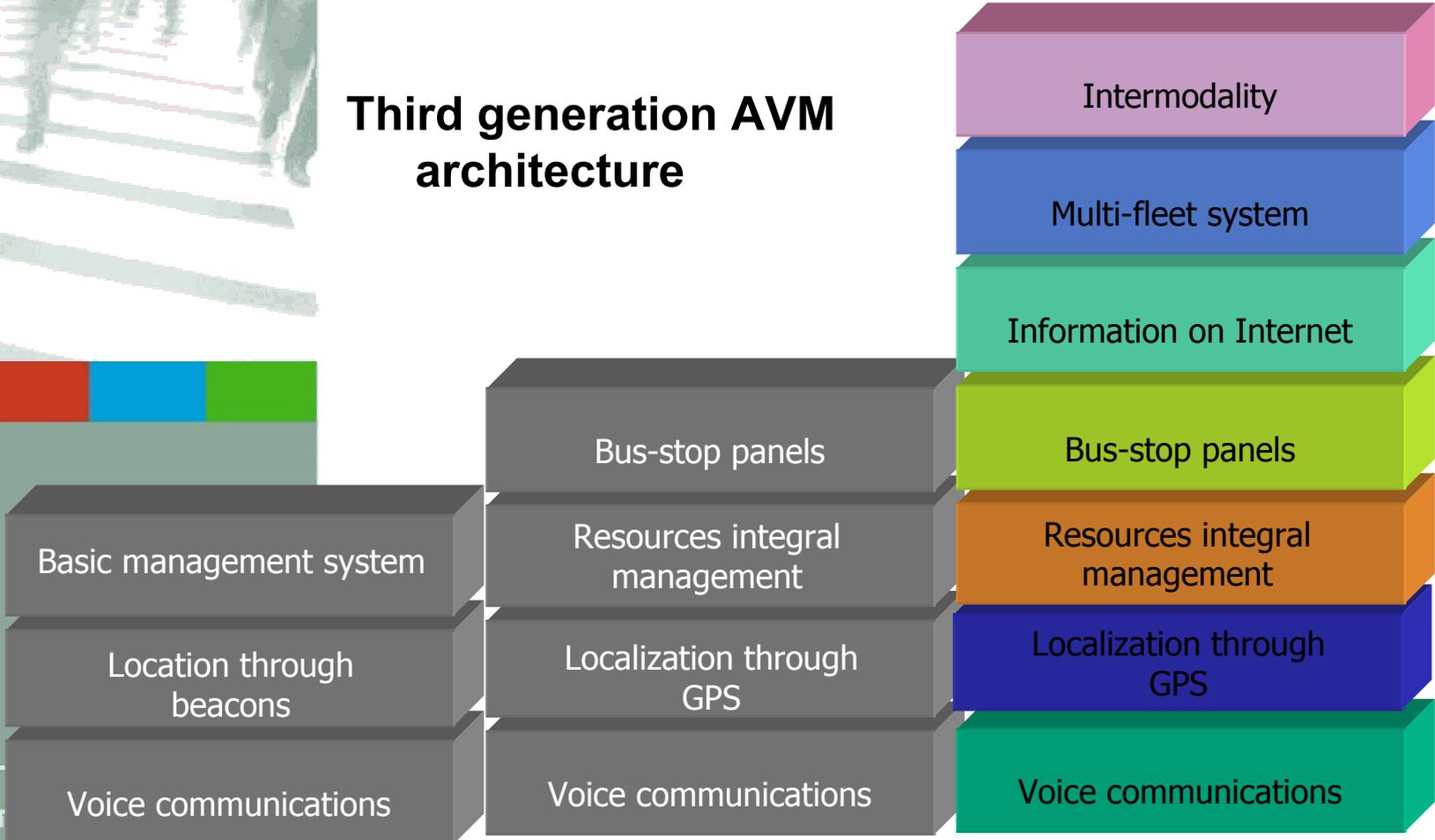
- ◆ **The AVM proposed by ATM for the rest of the integrated operators, is an intelligent management system for bus networks that allows the tracking & management through GPS of urban and interurban bus routes included in the ITS area.**

ATM's SAE, inter alia, aims to “fill-the-gap” by enabling smaller operators to acquire and operate systems in an integrated manner.





Third generation AVM architecture



ATM's AVM system

-The implementation of a **MULTIFLEET AVM** System generates several advantages for the unified system of public transport:

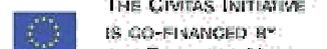
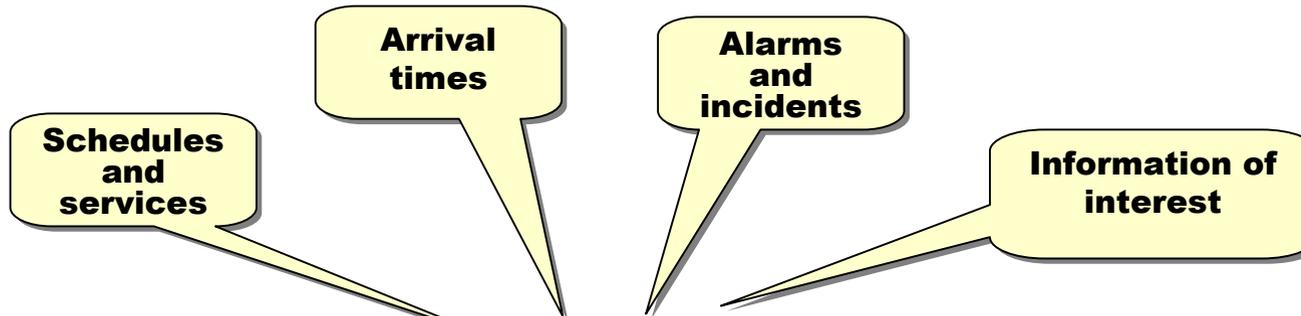
-Enables each operator to use the GPS location system to **track its own vehicles**, (as if in a standalone system) with messaging supported by **radio trunking or GPRS with capacity for no limitation of buses.**

-An implementation on this scale ensures the participation of smaller operators (overcomes the initial barrier that smaller operators would otherwise not acquire and install AVM equipment), **and serves as a “de facto” common specification for information interchange.**



Information systems

INFOMODALITY allows to centralize, gather information
INFOMOBILITY allows to distribute information



Infomobility:

Intermodal information is shown on electronic displays

From ATM

From the rest of RMB operators

From ATM:

- ◆ At modal interchanges.
- ◆ Onboard bus displays.

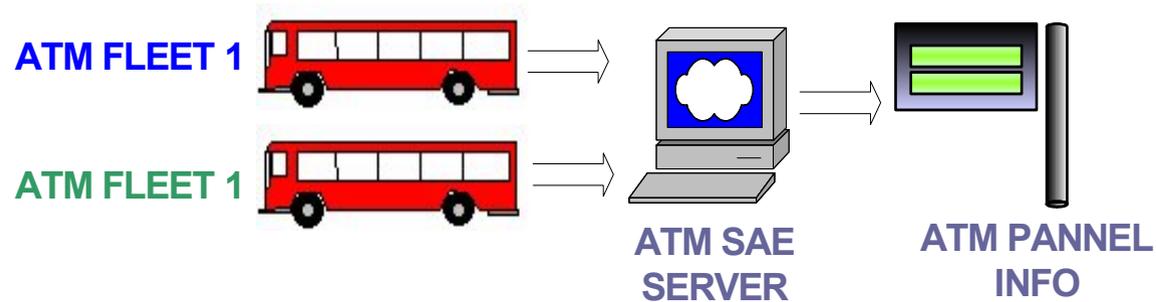


Two Schemes exist in the system:

- ◆ **Infomobility within ATM**
- ◆ **Infomobility ATM-Others**

Infomodality within ATM

- 1) Information shown on the same panel regarding buses of different ATM transport operators.



ATM AVM Server receives data from buses, and is in charge of arrival times calculations & managing communications

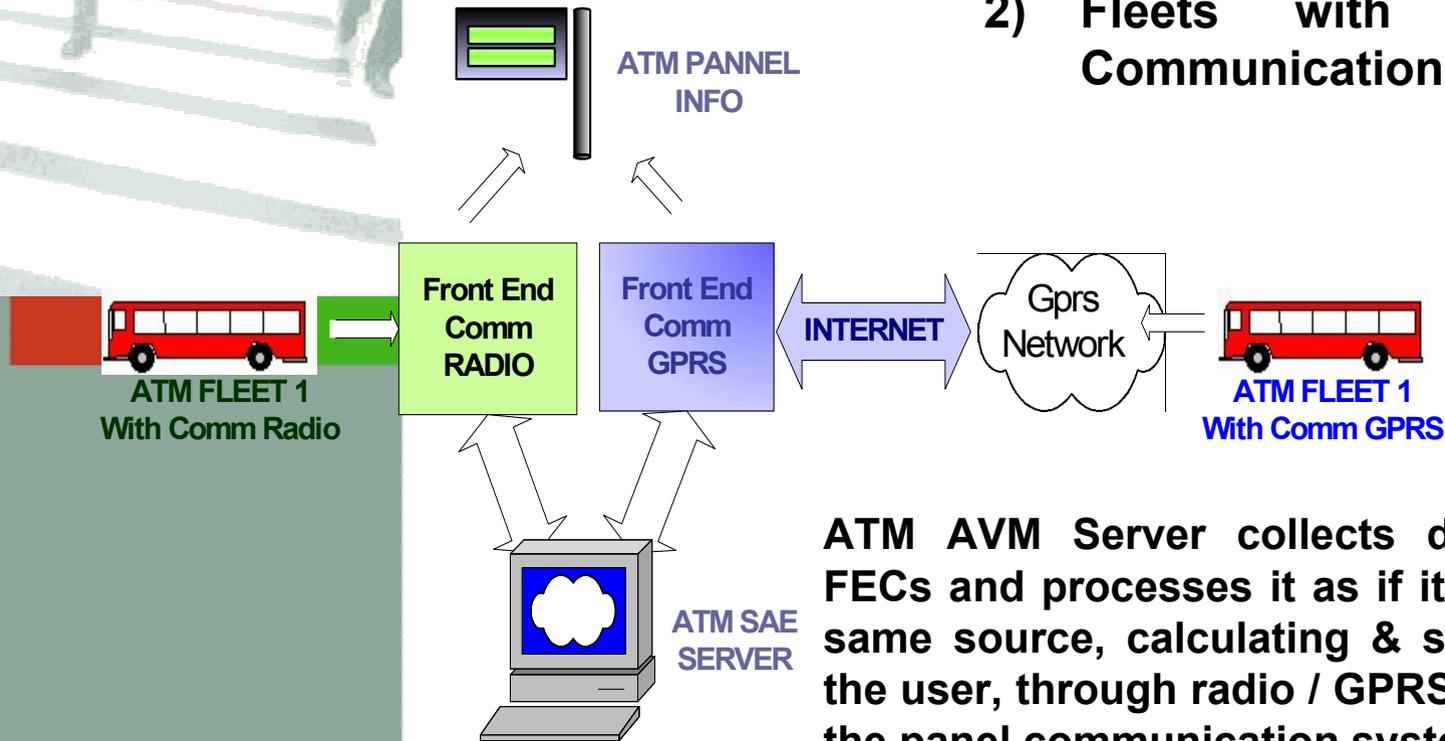


Example: Panel in Manresa, Esplugues...



Infomobility within ATM: Types Of Fleets

- 1) Fleets with Radio as Communication System
- 2) Fleets with GPRS as Communication System

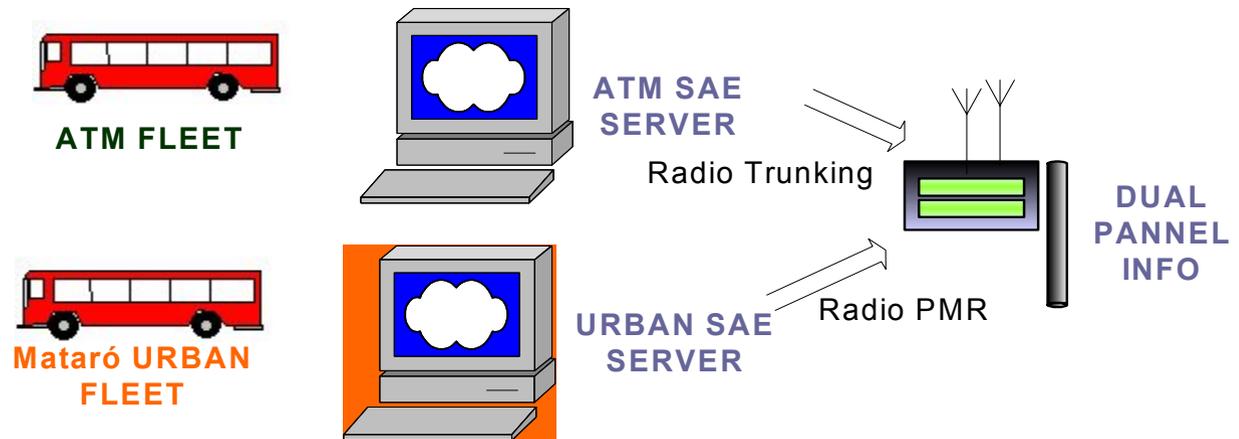


ATM AVM Server collects data from both FECs and processes it as if it came from the same source, calculating & sending info for the user, through radio / GPRS (depending on the panel communication system)

Infomobility ATM-Others: First Experiences

First case a fleet is controlled by another and different AVM System
Panels had to be installed with **DOUBLE COMMUNICATION TERMINALS**:

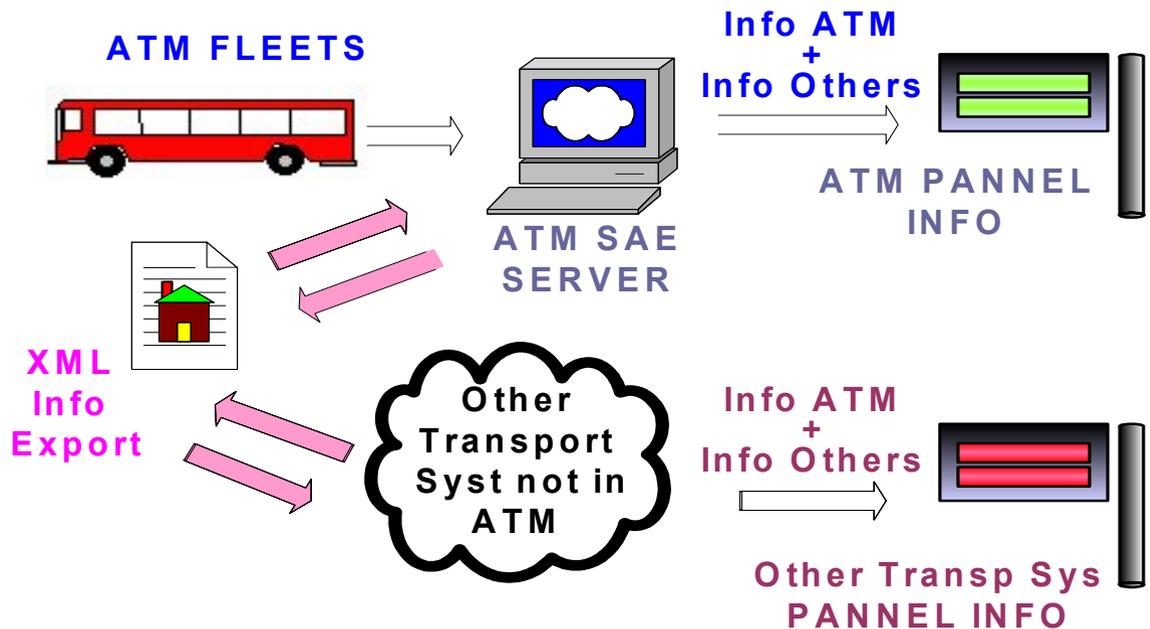
- ◆ Via **PMR Radio** Terminal from AVM controlling urban fleet
- ◆ Via **Trunking Radio** Terminal, from the AVM of ATM



Both AVM Servers are able to send their info to the CPU in the panel, which manages the display.

Infomobility ATM-Others: Final version

Information shown in the same panel regarding buses of ATM transport Operators and other different means / operators of transport (Renfe, TMB..). **Exchange via XML Protocol, info exported in a URL by the owner**



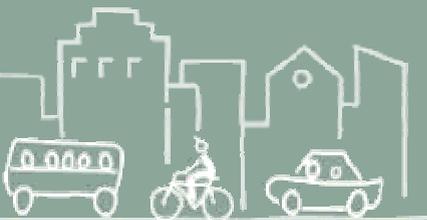
Stop selection & panel installation

The MIRACLES trials focus on the integration of bus services within the tramway corridor, where smaller operators co-exist with the largest bus operator, TMB.

Clearly, ATM used various criteria to select a first list of candidate stops

Transactions from the integrated ticketing system I.e. the common Fare Integrated System provide the basis for assessing the impact of information upon stop / service usage.

Another set of agreements concerned the involvement of the municipalities within which the **first** chosen stops were located.



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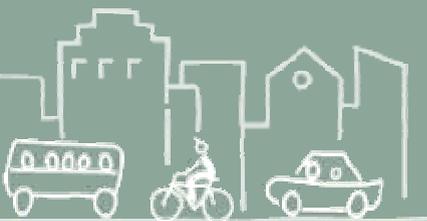
Agreements between ATM and the different Municipalities concern panel location, minor Installation works and electricity supply, while ATM remains in charge of its technical maintenance:

Four of six stops along the current tramway routes

Within 3 different municipalities

- **Pont d'Esplugues, (Esplugues de Llobregat)**
- **Les Aigües, (Cornellà de Llobregat)**
- **Bon Viatge & St Martí de l'Erm, (St. Joan Despí).**

Two of these stops are pending other actions (works in central Cornellà, tramway extension to St Joan Despí).





The smaller operators experienced the problem of not having ITS back-office systems such as digitized bus stops ...



... nevertheless an operational system was demonstrated for *Soler i Sauret* in Oct 2004, and early 2005 for *Mohn, Oliveras* and *Rosanbus*

**Example: Pannel in 4
Camins**



Progress & evaluation



Discussions as to how TMB's bus services in the corridor would interchange with the ATM bus information took a long time to resolve, but a solution was finally found based on the URL query linking the two servers. ...

Part of the reluctance from the main operator concerned the rationalisation (re-route) of the bus services following the implementation of the Trambaix tramway (which came into operation in April 2004)



**Example: Panel in Manresa,
Esplugues...**





Panel showing bus information at Pont d'Esplugues stop: operational September '05 for buses equipped with ATM AVM-system and TMB, operational Nov'05



The Multifleet Management System is **working** in the ATM environment, integrating information from small, medium & big operators.

The information system to the user is fully developed, technically, including the migration to lower-cost digital communications.

... So we begin to see long term benefits

Now the effort expended needs to be exploited via web & SMS and all possible media





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