The European Bus System of the Future comes to cities across Europe

Umberto Guida

UITP, International Association for Public Transport

PERUGIA, 29th November 2012

POLIS ANNUAL CONFERENCE

EBSF General Information

- Large Scale Integrated Project
  - Directorate General for Research and Innovation

- The largest European Research project about Urban BUS
  - Budget Total/ EU Funding: 26 MEUR (16 MEUR)
  - 7th Framework Programme of the EU
  - 2008 - 2012
  - More than 400 experts contributed to the project

- Coordinator: UITP - International Association of Public Transport
  - UITP represents about 3,400 mobility actors from 92 countries worldwide

Why a project about Urban Buses?

- New Mobility Challenges
  - Congestion, pollution, energy efficiency, quality time...
- Urban Bus a solution to new mobility challenges
  - highly efficient mode of public transport
    - cheap, flexible in terms of capacity and speed.
    - not require heavy infrastructure, is easy to put in service
  - the main carriers in Public Transport
    - **80%** of all public transport passengers worldwide
    - In Europe, every year, **30 billion of passengers take urban buses** - **60%** of whole PT movement
- Nevertheless, bus is perceived as a less attractive mode of public transport

EBSF Objective: the Bus Renaissance! Improve attractiveness and image of urban bus systems

EBSF – System Approach

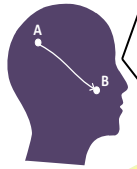
"The whole is more than the sum of its part"

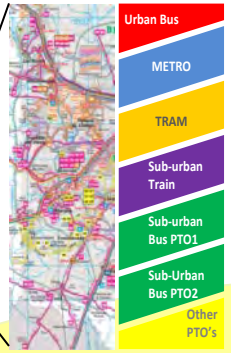
Aristotle, Metaphysics

Urban Infrastructure

Bus Vehicle

Mobility Operational Concepts





47 EBSF Consortium Members
22 EBSF User Group Members
Goteborg
Bremerhaven
Rouen
Paris
Budapest
Madrid
Rome

EBSF Logic - Key Areas of Innovation

Project Development Logic

- *User Needs*
- *System Definition*
- *Requirements*
- *Solutions Design*
- *Development of Technology or Concepts*
- *Demonstrator*
- *Use Case execution*
- *Evaluation of Results*

Life on Board

Dynamic Passenger Information

Energy Management

Bus Stop

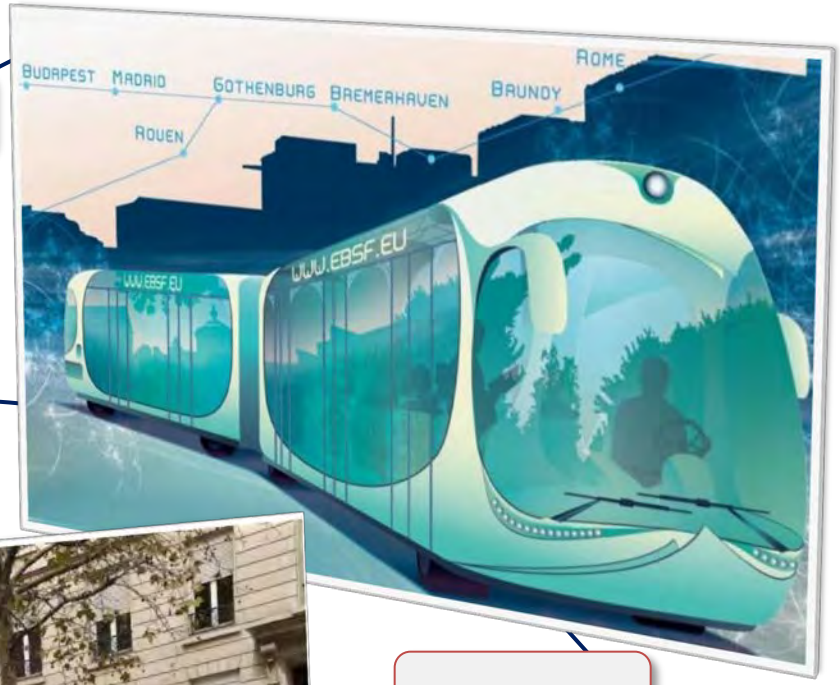
Passenger Flow

Accessibility

Capacity

Driver Comfort

Intermodality (Interchanges / Hubs)



Energy Efficency

Information Technology

Electrification of Urban Bus Systems

Modularity

Remote Diagnostic

Efficiency of travel

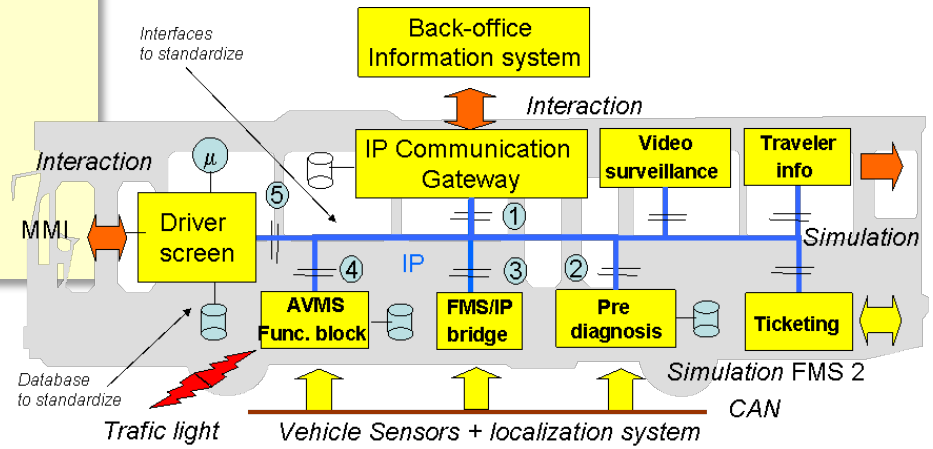
IT Systems (AVMS) Interoperability

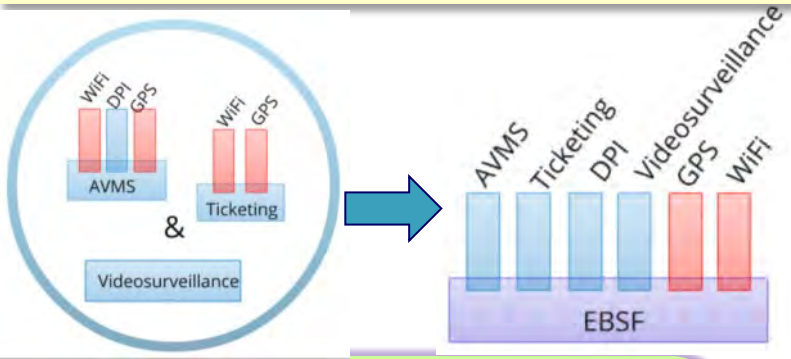
Policy and rules for efficient Bus Services

EBSF
IT ARCHITECTURE

EBSF IT architecture

- Open and Service Oriented Architecture
- Based on Standard Internet technologies
  - IP interfaces and communication protocols
  - ensuring Interoperability
- Simple on-board installation rules
  - Vehicles equipped by manufacturers with basic IT network capabilities
- To build key and new Interoperable functions
  - **Display Passenger Information** (DPI)
  - **Automatic Vehicle Monitoring** (AVMS)
  - **Remote Maintenance** (RMS)
  - **Multi-Application Driver Terminal**





Bus manufacturers (4)

irisbus IVECO · Mercedes-Benz · VOLVO · MAN

Operators (6)

VEOLIA TRANSPORT · TRANSDEV · BREMERHAVEN BUS · RATP · atac ROMA · ATM · BKV ZRT

Suppliers (7)

init The Future of Mobility · INEO GDF SUEZ · ULTRON · Hogia · ACTIA · digigroup · Pilotfish

PTA (2)

ASSTRA · CONSORCIO TRANSPORTES MADRID

Consultant (2)

Helmut Berends · TEKIA

R&D centers (1)

IFSTTAR

EBSF IT Specifications FREE

www.ebsf.eu

Technical specifications of architecture & interfaces

Platform on-board installation requirements

EBSF Test-bench

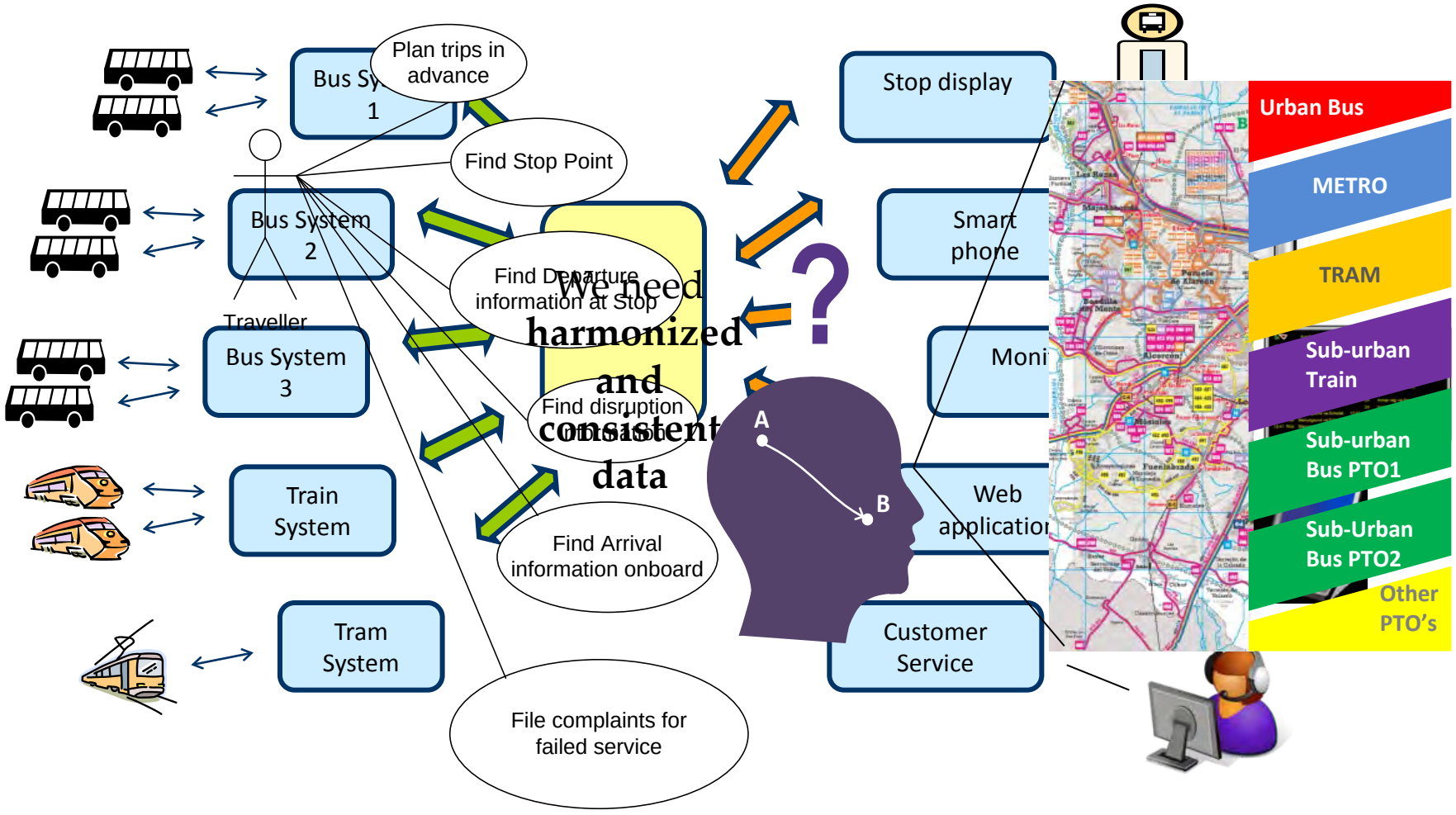
Paris

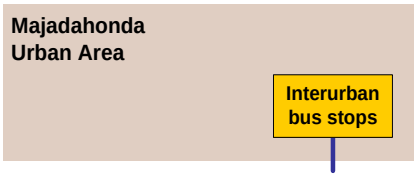
EBSF IT Standardisation

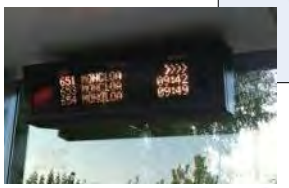
European standardization in CENTC278

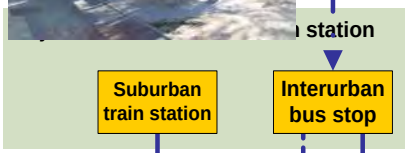
MADRID

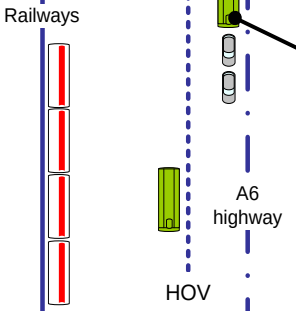
Intermodality: importance of integrated and Real Time Information

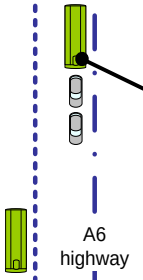


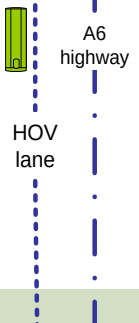


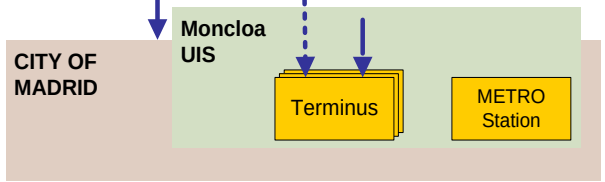












Use Case setting

CONSORCIO TRANSPORTES MADRID

Increased perception of

- **travel quality and service (comfort, cleaness, quality feeling) (+6%)**
- **availability of information (+20%)**
- **stops quality (+9%)**
- **waiting time (+8%)**
- **integration of bus services with other modes (+35%)**

Increased general satisfaction with the service (+7%)

Specifications implemented on **2000** HOV Madrid commuter buses

GOTHENBURG
Accessibility and Driver training

Visual Guidance and dedicated training for better docking

Smart Driving system and tailored training

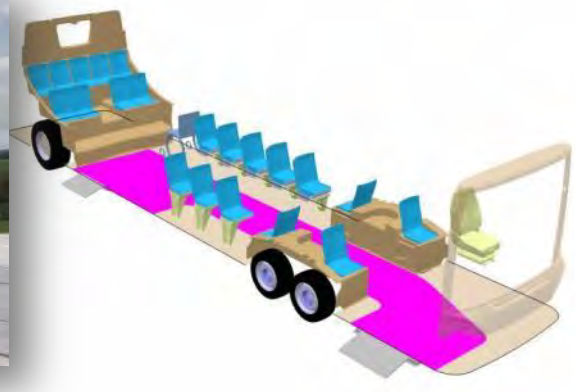
Dwell time 5,75 min (-25%)

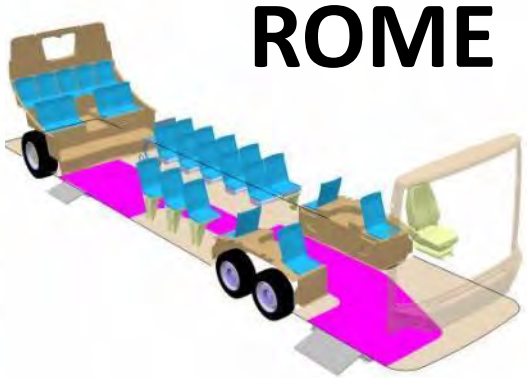
Average speed 25 Km/h. (+4%)

Capacity 139 passengers (+20%)

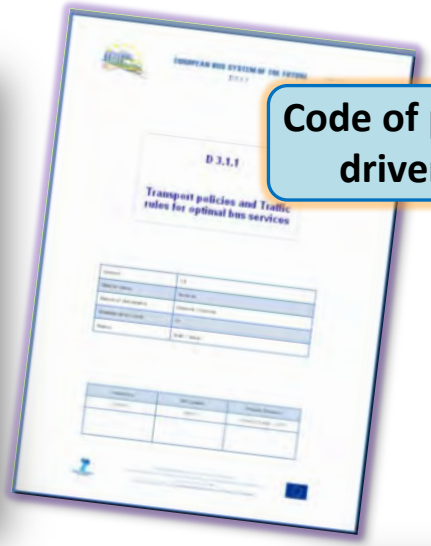
Required buses 12,1 (-18%)

ROME

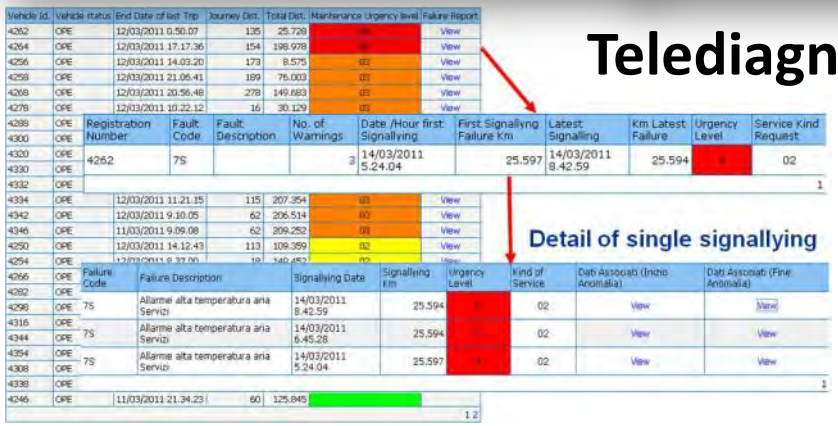




Flexible internal layout – 21 to 26 seats capacity



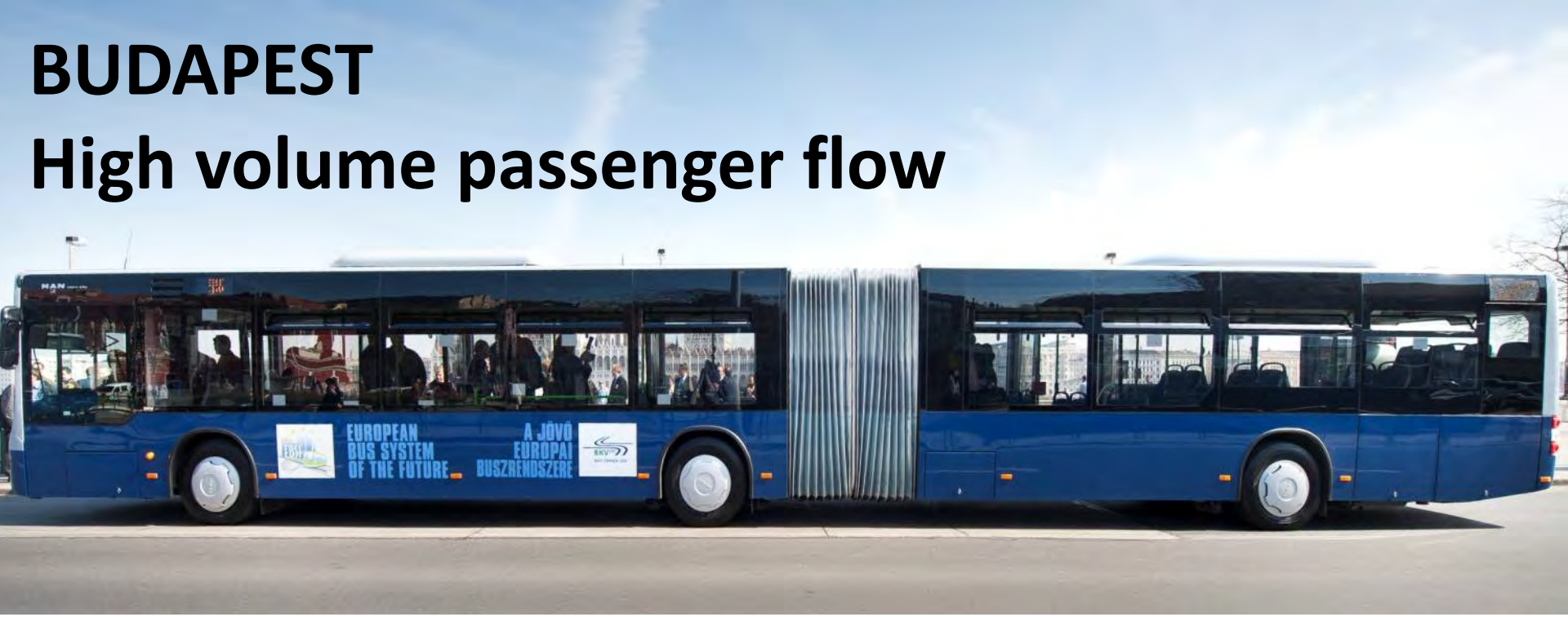
Code of practices of driver's cabin

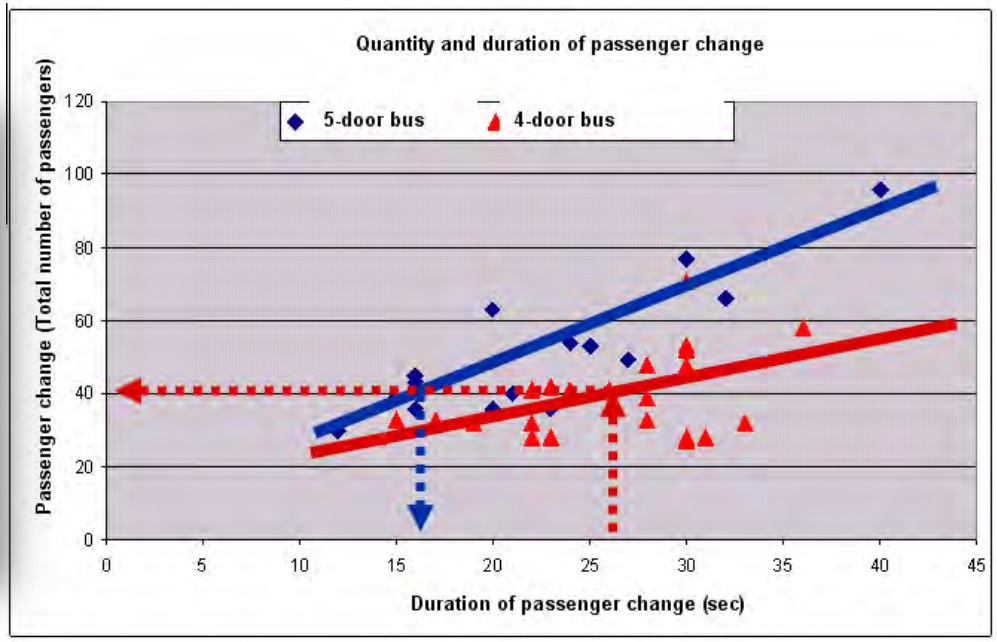


Telediagnostic on 50 CNG buses

Name KPI	Units/source	Variation (%)
Technical maintenance of the bus	Days between maintenance	+6%
Vehicle failure	Failures in a bus/km	- 15%

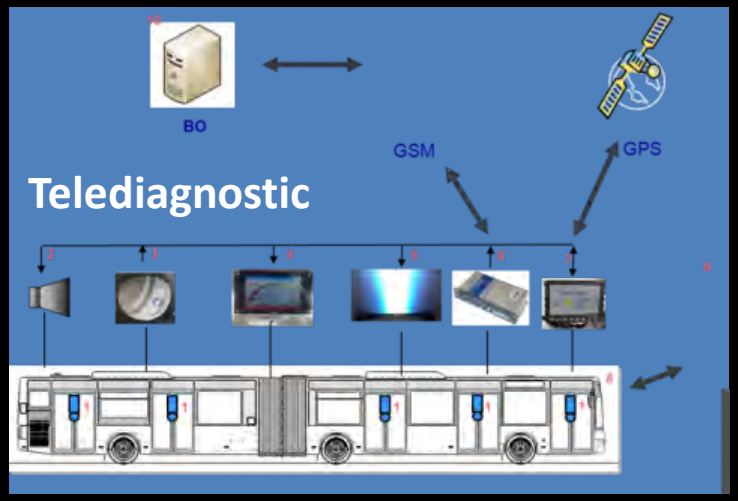
BUDAPEST
High volume passenger flow





Areas of investigation	KPI	Units	% variation
Service performance	Dwell time	sec	13%
	Commercial speed	Km/h	4%
Comfort, cleanness and quality feeling/ perception	Perceived comfort level on-board		7.7%
Environmental issues	Energy consumption	Litres*1000/ pass-km	16.8%
Economic and operation issues	Operating costs	€/km	16.7%
	Passenger capacity	Places-km	3.3%

Service comfort



Bremerhaven
Attractive Bus Design

GPS Amplifier and WLAN Router

Illuminated Door Frames

Seat Occupancy System

230V Sockets

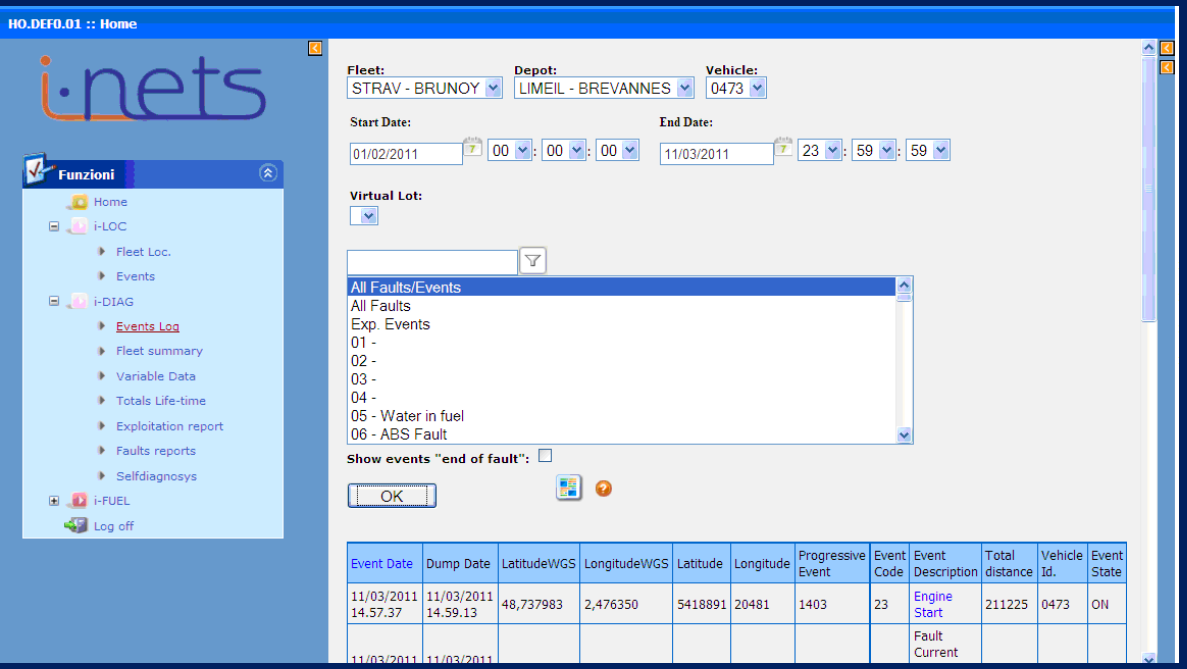
PT Real-Time multimodal Information

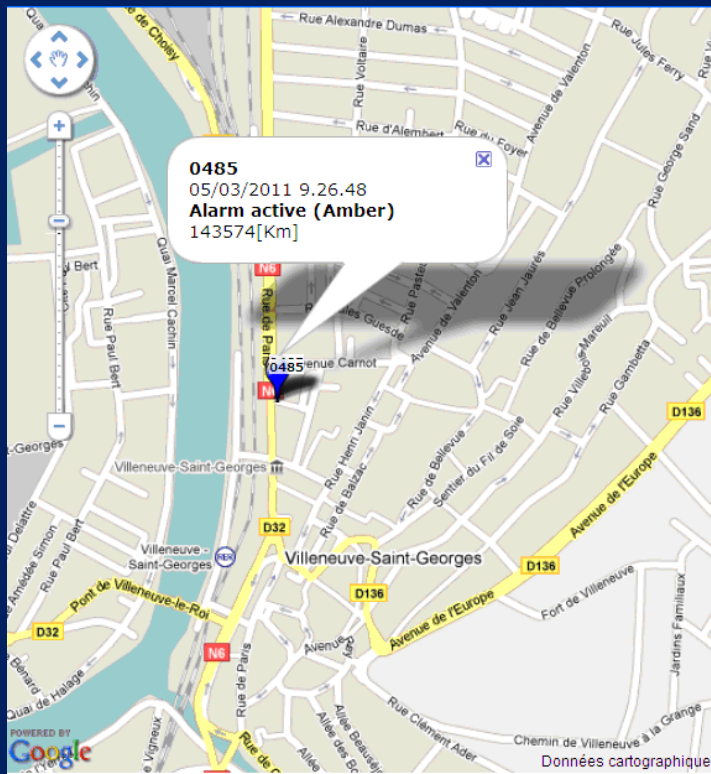
Infotainment
Events, touristic information

E-Services

BRUNOY

Telediagnostic & Remote Maintenance





Service reliability

Anticipate interventions

Reduce time & costs of interventions

Areas of investigation	KPI	Unit / Source	Variation (%)
Maintenance	Technical maintenance of the bus	Days between maintenance	+51%
	Days in workshop	Days	-60%
	Ratio of non-working vehicles	%	-25%

ROUEN

A further step towards accessibility for all passengers

EBSF
BUS STATION

EBSF Bus-Stop – city side & bus side

A « concept bus-stop » testing modular services and solutions

city side

bus side

Not just a waiting area but a urban space with services to passengers and citizens

EBSF Bus-Stop – information, communication & services for transport

Integrated panels, fixed information, screens for dynamic info, interactive systems

Digital information elements as expensive as the structure

Electric bikes

ticket machines

EBSF Bus-stop services: Mini-kiosque and bibliotheque self-service

Agreement with vendors and associations

Attract new players
Enable new business cases

EBSF Bus-Stop: multiservice

Wi-fi,
recharging plugs,
defibrillateur,
heating glass,
ambient sound & lights,
JCDecaux totem

Highly appreciated by citizens / users

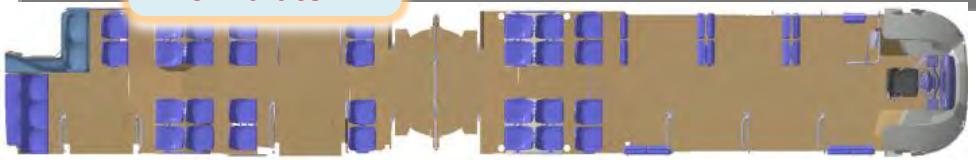
Higher maintenance costs but… allow new business cases

Modular solutions and services

The European Bus System of the Future comes to cities across Europe

- Transferability of EBSF solutions across Europe
  - CIVITAS methodology
  - Exercise on-going
  - Umbria Mobilita’
- Web-tools for supporting transferability
  - Developed Solution
  - Bus System functional specifications

accessibility simulator



Wooden mock-up

Bus-stop prototype in Paris

Combined simulation for passenger, bus and bus-stop interaction

Test in Goteborg

Accessibility and passenger flow solutions

New internal layout, new folding seats and door dimension

RATP CHALMERS VOLVO ceit ik4 research alliance

EBSF Project

5 Main European Bus manufacturers joint resources for pre-competitive research

Efficient and open platform for dialogue between urban bus transport stakeholders

The reference for Bus System research in Europe

- ✓ *Definition of EBSF System*
- ✓ *Development and test of innovation on vehicle*
  - ✓ *accessibility, driver workplace, modularity, energy management*
- ✓ *Development of innovation on infrastructure and operational concepts*
  - ✓ *Interchanges, bus station*
- ✓ *7 EU Use Cases*
- ✓ *Vision and Recommendations*
- ✓ *IT Standard architecture development and test*

Further research on Bus Systems

Exploitation of the Bus System Innovations

iBS

Bus Systems Roadmap

Areas and priorities for research on Bus Systems

First release developed in collaboration with ERTRAC

Bus Systems Exploitation / Innovation Platform

From research to Innovation

Bus Systems innovation strategy

Bus Systems “quality label”

Consolidation of solutions

EBSF IT Platform

Driver’s workplace

Apply solutions, concepts, approach

EBSF Project

Further research on Bus Systems

Exploitation of the Bus System Innovations

Bus Systems Roadmap

- *Bus Integration in new urban scenarios*
- *IT platform integration / standard adoption*
- *Sustainable bus system*
  - *Energy efficiency*
  - *Environmental performances*
  - ***Electrification** of bus systems*
- *Innovative vehicle technologies*
- ***Modularity***
- *Mobility challenges of an ageing society*

Bus Systems Exploitation / Innovation Platform

- From research to Innovation
- BS innovation strategy
- BS "quality label"

Consolidation of solutions

- EBSF IT Platform
- EBSF Driver's workplace

Apply solutions, concepts, approach

- **Capitalise on successful projects about Bus Systems (EBSF, COST-BRT..)**
- **Coordinate research**
- **BS Roadmap and funding frame**
- **Exchanges of knowledge about bus systems with international experts**
- **Disseminate BS research results**
- **Support deployment and implementation of BS innovations**
- **Exploitation/Innovation Platform**
- **Topics:** *accessibility, special events, intermodality, level of service, modularity, energy, IT*

Interchanges (NODES)

IT Platform (EUROPTIMA)

Electrification of Bus Systems

Thank you for your attention

More information at

http://www.ebsf.eu/

or contact

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