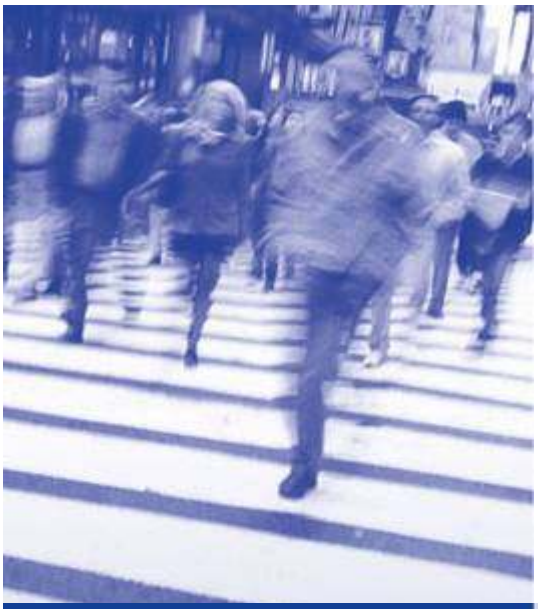

CiViTAS
Cleaner and better transport in cities

ARCHIMEDES
AALBORG • BRIGHTON & HOVE • DONOSTIA - SAN SEBASTIÁN • IAŞI • MONZA • ÚSTÍ NAD LABEM

Donostia – San Sebastian

R 75.1 Study of Park & Ride Parking Guidance System in Donostia – San Sebastian

Donostia – San Sebastian

May 2011

THE CIVITAS INITIATIVE
IS CO-FINANCED BY THE
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Task:	11.8.2 Park & Ride Parking Guidance System
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Contents

1. Introduction

1.1 Background CIVITAS

CIVITAS - cleaner and better transport in cities - stands for CIty-VITAlity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.

CIVITAS I started in early 2002 (within the 5th Framework Research Programme);
CIVITAS II started in early 2005 (within the 6th Framework Research Programme) and
CIVITAS PLUS started in late 2008 (within the 7th Framework Research Programme).

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy and road safety, alternative fuels and the environment.

Within CIVITAS I (2002-2006) there were 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

Objectives:

- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

Horizontal projects support the CIVITAS demonstration projects & cities by :

- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organisation of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

Key elements of CIVITAS

- CIVITAS is co-ordinated by cities: it is a programme “of cities for cities”
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living ‘Laboratories' for learning and evaluating

1.2 Background ARCHIMEDES

ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas.

The objective of ARCHIMEDES is to introduce innovative, integrated and ambitious strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in the policy fields of energy, transport, and environmental sustainability. An ambitious blend of policy tools and measures will increase energy-efficiency in transport, provide safer and more convenient travel for all, using a higher share of clean engine technology and fuels, resulting in an enhanced urban environment (including reduced noise and air pollution). Visible and measurable impacts will result from significantly sized measures in specific innovation areas. Demonstrations of innovative transport technologies, policy measures and partnership working, combined with targeted research, will verify the best frameworks, processes and packaging required to successfully transfer the strategies to other cities.

1.3 Participant Cities

The ARCHIMEDES project focuses on activities in specific innovation areas of each city, known as the ARCHIMEDES corridor or zone (depending on shape and geography). These innovation areas extend to the peri-urban fringe and the administrative boundaries of regional authorities and neighbouring administrations.

The two Learning cities, to which experience and best-practice will be transferred, are Monza (Italy) and Ústí nad Labem (Czech Republic). The strategy for the project is to ensure that the tools and measures developed have the widest application throughout Europe, tested via the Learning Cities' activities and interaction with the Lead City partners.

1.3.1 Leading City Innovation Areas

The four Leading cities in the ARCHIMEDES project are:

- Aalborg (Denmark);
- Brighton & Hove (UK);
- Donostia-San Sebastián (Spain); and
- Iasi (Romania).

Together the Lead Cities in ARCHIMEDES cover different geographic parts of Europe. They have the full support of the relevant political representatives for the project, and are well able to implement the innovative range of demonstration activities.

The Lead Cities are joined in their local projects by a small number of key partners that show a high level of commitment to the project objectives of energy-efficient urban transportation. In all cases the public transport company features as a partner in the proposed project.

2. Donostia – San Sebastian

The city of Donostia -San Sebastián overlooks the sea and, with a bit more than 180,000 inhabitants, keeps a human scale. Some people consider the balanced combination of small mountains, manor

buildings, and sea as the setting for one of the most beautiful cities in the world. We have a tradition in favouring pedestrians, cyclists and public transport.

For about twenty years, the city has been enforcing a strong integrated policy in favour of pedestrians, bicycles and public transport. Considering walking and cycling as modes of transport has led to the building of a non-motorised transport network for promoting this type of mobility around the city.

Likewise, the city has extended its network of bus lanes. The city holds one of the higher bus -riding rates, with around 150 trips per person per year.

2.1 Objectives in CIVITAS

The CIVITAS project is a perfect opportunity to expand our Sustainable Urban Transport Strategy. With the package of CIVITAS measures Donostia-San Sebastián wants to:

- Increase the number of public transport users
- Decrease the number of cars entering in the city centre
- Increase the use of the bicycle as a normal mode of transport
- Maintain the high modal share of walking
- Reduce the number of fatal accidents and accidents with heavy injuries
- Reduce the use of fossil fuels in public transport.

3. Background to the Deliverable

This deliverable concerns Measure 75, Park & Ride Parking Guidance System in Donostia – San Sebastián.

Parking Guidance Systems (PGS) are designed to ease congestion resulting from vehicles travelling to a city's parking facilities by directing vehicles to the nearest available parking space and reducing congestion in city´s general traffic, at the same time as offering energy savings linked to journeys to the parking facilities and making the city more attractive to visitors.

PGS also helps control parking and traffic by directing drivers to available parking facilities throughout cities, universities, airports, shopping centers, etc. through the use of vehicle counting technology and space availability signage

It has become evident that to ensure the highest possible occupancy, optimal space utilisation and provide a stress-free pleasurable environment for parking customers, it is necessary to manage the movement of vehicles within these facilities.

The benefits of a Parking Guidance System (PGS) for cities:

- Resolves congestion during high traffic hours.
- Reduces pollution in the car park as cars circulate for less time and emit fewer gases.
- Real-time garage capacity management and better tracking of parking customer behavior.
- Management can monitor and change practices to increase revenue and customer satisfaction.

- Increase customer satisfaction.

Parking Guidance Systems benefit drivers by:

- Directing drivers to available parking spaces.
- Reduce drivers time searching for available parking space thus saving petrol and reducing vehicle wear and tear.
- Minimise potential stressful situations and reduce the risk of accidents.

In general, Parking Guidance Systems provide:

- Significant reduction in vehicle emissions by eliminating the “cruising” effect of searching for a parking space.
- Optimisation of all public and private parking spaces by providing real-time space inventory to the public.
- Control parking occupancy by Facility, Level, Zone, or Individual Parking Space.
- Economic, environmental and a customer friendly environment.

3.1 Summary Description of the Task

Within measure 75, task 11.8.2 covers the research conducted by the city of Donostia – San Sebastián, installing Variable Message Signs (VMS) informing car drivers about free parking places in Park & Ride areas in real time throughout the city; covering the warnings and recommendations issued, the data centralisation system and proper devices for its operation.

4. Study of Park & Ride Parking Guidance System in Donostia – San Sebastian

4.1 – Introduction

The municipality of Donostia – San Sebastian has seen the need to reform, improve and complete the existing information system for Park & Ride parking places with the objective of informing users about Park & Ride parking places in the city and its level of occupation, so they can decide where to go at a stage when they have enough time to decide.

Being aware of the benefits which such an infrastructure may generate in a city's general traffic the municipality of Donostia – San Sebastian has pressed ahead with a major effort to put into service a new system of information on Park & Ride parking available places.

4.2 – Background

To date, the only signposting available in the City about parking places is limited to signposting of underground parking.

Drivers are guided to their car park locations by static signposting, as shown by following Figure 1.

Fig 1: Signposting guiding to Parking Easo

Fig 2: Signposts guiding drivers to different Parking locations

In addition, and always in relation to inner city areas, more information is offered to drivers informing them not only of underground parking locations but also the general situation (full or free parking) through the use of green and red lights, as shown in the following figures.

Fig 3 Signposts with lighting used to indicate status of parking situation

Fig 4: Signposts with lighting used to indicate status of parking situation

4.3 – Description of the Work Done

Being aware of the lack of information regarding the number of vehicles entering the city and the need to improve current parking signposting system, it was clear that any new system would ideally need to meet both requirements. It was anticipated that a Parking Guidance System, such as the one described above, would do just that and that that any system must provide consistent information.

In this sense, two types of signposting were considered:

- Variable message signs (VMS), carrying warning and recommendation messages, to be installed at the edge of the city on the main entry routes as wel as individual locations.
- Parking availability information signposting, to be installed at parking searching routes.

4.3.1 VARIABLE MESSAGE SIGNS (VMS), WARNINGS AND RECOMMENDATIONS.

Information signposts need to be compact so that the information is grouped in the same panel.

In these panels, the city´s parking status information is shown, grouped by zones or individually. Warnings/recommendations, or any other type of information that system centralises would also be displayed.

4.3.1.1 VMS panel design

Each panel consistis of 4 lines of related information and each information line is composed of 15 digits.
Information is shown in Red, Green or Yellow.

Variable information brightness level needs to be programmable in order for it to adapt it to existing lighting conditions.

The VMS Panels are supported with a single post, so that the impact on road traffic is minimised.

When WMS panels are located in pedestrian areas they will be subject to current accessibility legislation.

The technical specification is as follows:

- 3 colours alphanumeric information display (Red, Green, Yellow), depending on the message to show.
- Alphanumeric character of 124 mm in height: LED matrix minimum size of 124,46 x 88,9 mm.
- 5 columns and 7 rows consisted LED matrix. Minimum pixel spacing of 17,78 mm.
- Pixel: 2 diagonal LED, one in green color and the other one in red, both with a typical value of 2 Cd and a 30º (or similar) viewing angle.

4.3.1.2 Information to be displayed

VMS Panels need to be capable of transmitting at least the following set of information:

- Occupancy status of city´s Park & Ride parkings, individually or grouped by zones, according to the following table of underground parkings to centralise.

Nº	PARKING	ROT	TYPE	ZONE	TITULARITY
1	ARCCO AMARA	214	ROT	AMARA	MUNICIPAL
2	PIO XII	339	MIX	AMARA	MUNICIPAL
3	ILLUMBE	500	ROT	AMARA	MUNICIPAL
4	ZUATZU	500	ROT	ANTIGUO	MUNICIPAL
5	ANTIGUO BERRI	489	ROT	ANTIGUO	PRIVADO
6	BOULEVARD	386	MIX	CENTRO	MUNICIPAL
7	BUEN PASTOR	384	MIX	CENTRO	MUNICIPAL
8	CERVANTES	607	ROT	CENTRO	MUNICIPAL
9	OKENDO	767	ROT	CENTRO	MUNICIPAL
10	EASO	146	MIX	CENTRO	MUNICIPAL
11	SAN MARTIN	300	MIX	CENTRO	MUNICIPAL
12	ATOTXA	210	ROT	EGIA	MUNICIPAL
13	KURSAAL	304	MIX	GROS	MUNICIPAL
14	CATALUÑA	477	ROT	GROS	MUNICIPAL
15	TXOFRE	465	ROT	GROS	MUNICIPAL

- Warnings, recommendations, or any information that may be interesting to improve the overall traffic flow of the city.

By default, VMS panels will provide information on about the occupancy status of Park & Ride parkings, grouped as follows:

- “Centro” zone: Okendo, Boulevard, Cervantes, San Martín
- “Centro – Amara” zone: buen Pastor, Easo
- “Gros” zone: (Katalunia, Txofre, Kursaal, Atotxa)
- “Amara Nuevo” zone: (Pío XII, Arcco Amara)

Depending on the occupancy status of each zone, information will be given out in different colours to inform the driver, at a glance, the occupancy status of the zones.

The system will enable the display of different information in each of the panels.

The following illustrations show the proposed drawings for this type of signpost.

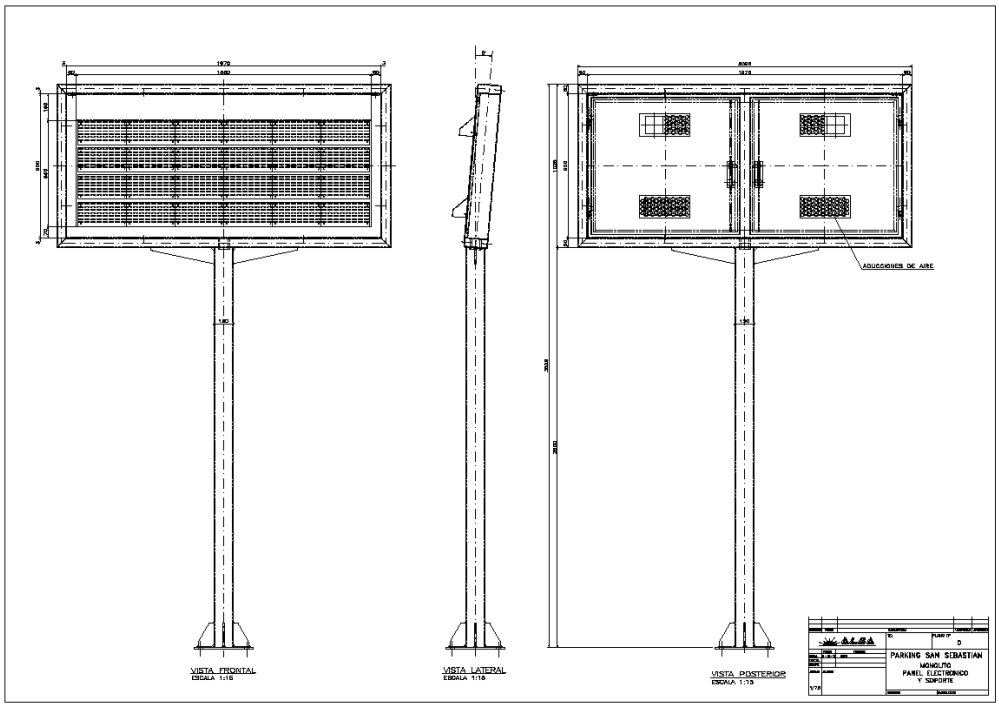


Fig.5 General views of a VMS panel.

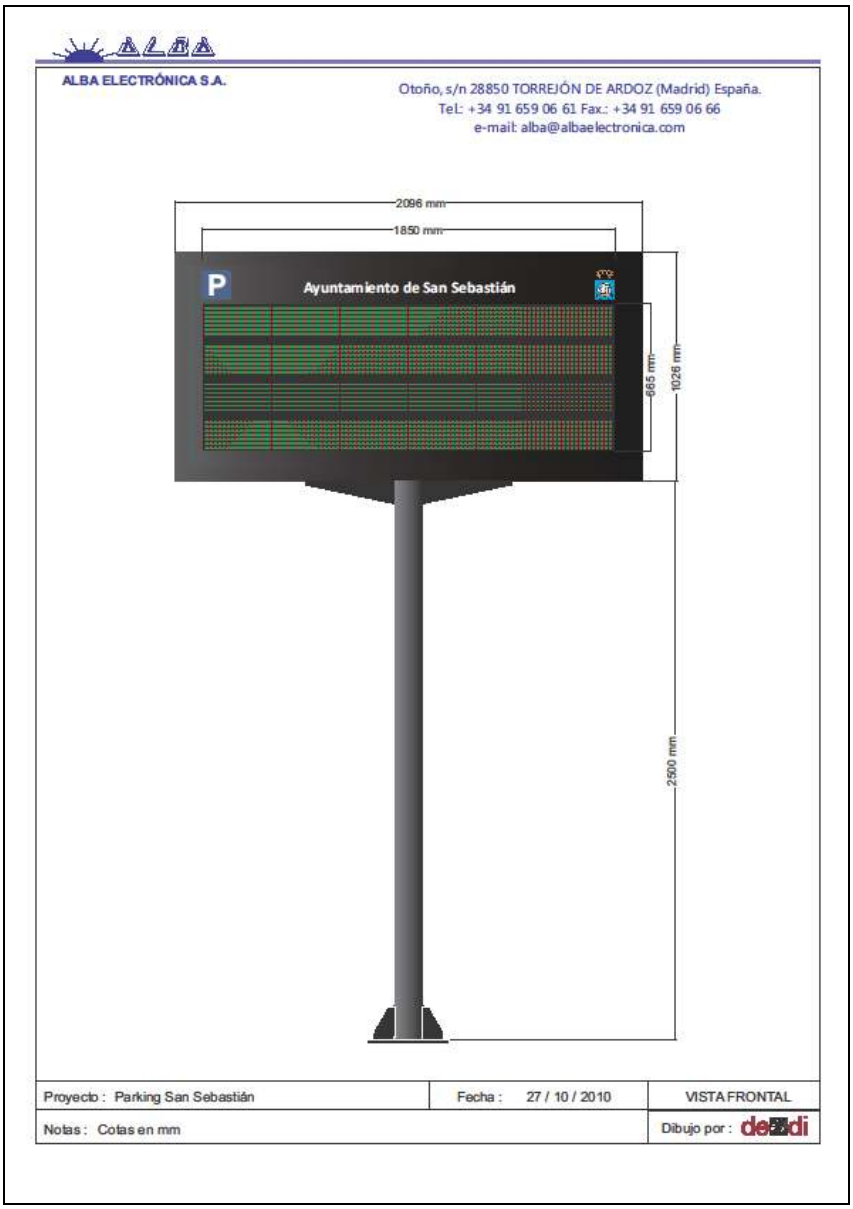


Fig 6. Rendered image of a VMS panel with overal dimensions

4.3.2 PARKING AVAILABILITY INFORMATION SIGNPOST

Information panels need to be compact so that information is grouped in a single panel, or composed by modules.

On these panels information will be displayed about the available places in each parking facility, or its current status: Available, Full, Maintenance work in progress.

Depending on each location, information on available parking places will be complemented with fixed information panels.

In Annex I, expected panels are listed with contents and proposed location.

As it can be seen in Annex 1, there are some panels without available-parking places information. Parking names can be replaced by similar ones, or even by numbers (P1, P2, …).

4.3.2.1 Parking availability information signpost design

Dimensions of each information panel or module will be a maximum of 1.915 x 515 mm.
Each information line or module will contain the following information according to Annex I:

- S-17 sign.
- Parking name and distance from panel to nearest access.
- 4 digits.
- Directional information (Arrow).

Information showing available parking places will be shown in Red, Green or Yellow.

Variable information brightness level needs to be programmable to adapt it to existing lighting conditions.

Panels will be supported with a single post, so that the impact on road traffic is minimal.

When panels are located in pedestrian areas they will be subject to current accessibility legislation.

The technical specification is as follows:

- Numerical indication of available-places in 3 colours (Green, Red, Yellow) depending on occupancy levels.
- Alphanumeric character of 124 mm in height: LED matrix minimum size of 124,46 x 88,9 mm.
- 5 columns and 7 rows consisted LED matrix. Minimum pixel spacing of 17,78 mm.
- Pixel: 2 diagonal LED, one in green color and the other one in red, both with a typical value of 2 Cd and a 30º (or similar) viewing angle.

4.3.2.2 Information to be displayed.

Panels will be capable of transmitting at least the following information:

- The quantity of free parking places.
- Parking status (according to occupancy percentage):
  - Free
  - Full
  - Maintenance work in progress

Depending on the occupancy status of each parking facility, information will be displayed in different colours to inform the driver, at a glance, the occupancy level status.

The following illustrations show the proposed drawings for this type of signposts.

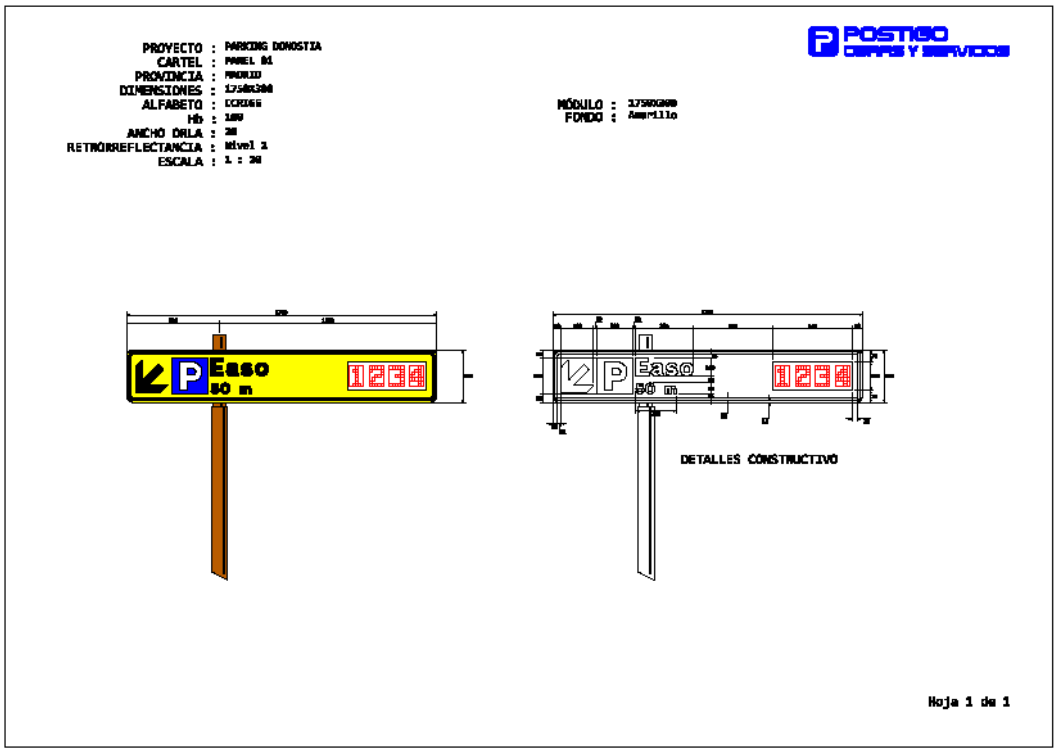


Fig 7. Information signposting with a single parking panel

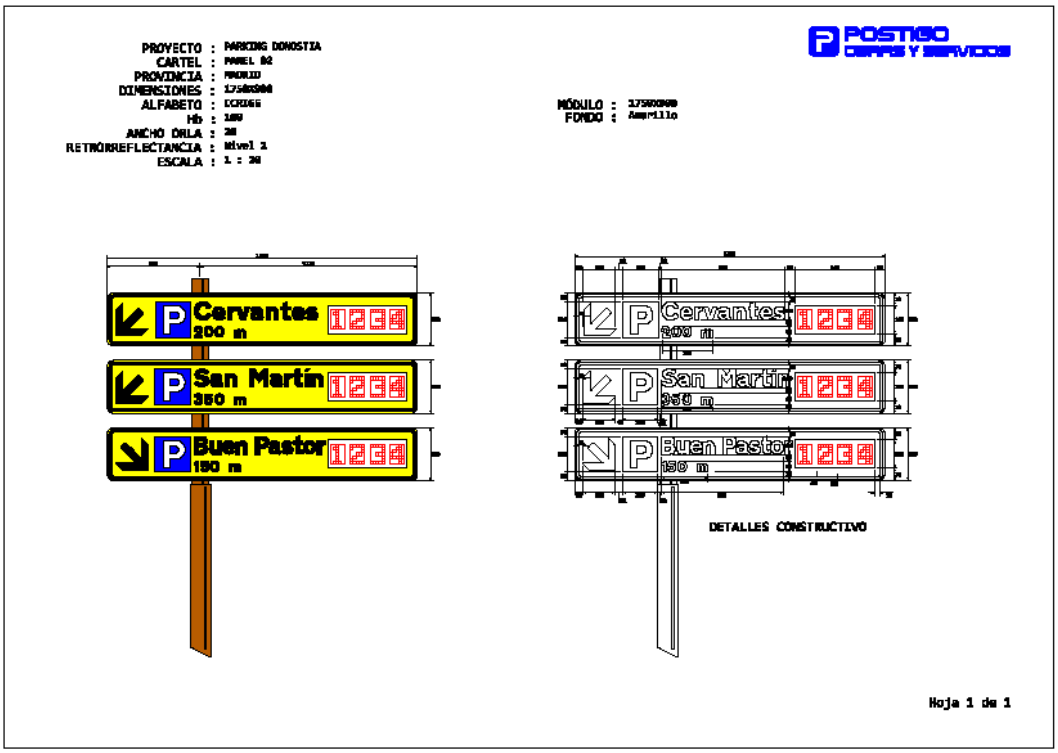


Fig 8. Information signposting with three parking panels

4.3.3 DATA CENTRALISATION SYSTEM AND OPERATION DEVICE

A data centralisation system will enable data process and warnings/recommendations to be broadcast from the traffic control center towards the panels located throughout the city. The underground Park & Ride areas covered are listed in the table shown in paragraph 4.3.1.2.

The system is totally customisable and programmable, so that it will be possible to:

- Modify expected parking groupings.
- Emit different warnings/recommendations in each of the VMS panels.
- Store Park & Ride parking bay occupations historically.
- Store Warnings/Recommendations historically.
- Schedule events to display in VMS panels.
- Emit operating alarms
- Record operating alarms
- Expand the number of Park & Ride areas operated within the system.

Data centralisation system will automatically capture the occupation status information of each Park & Ride parking fron the data obtained by the operating device, and it will transfer this information to the control centre.

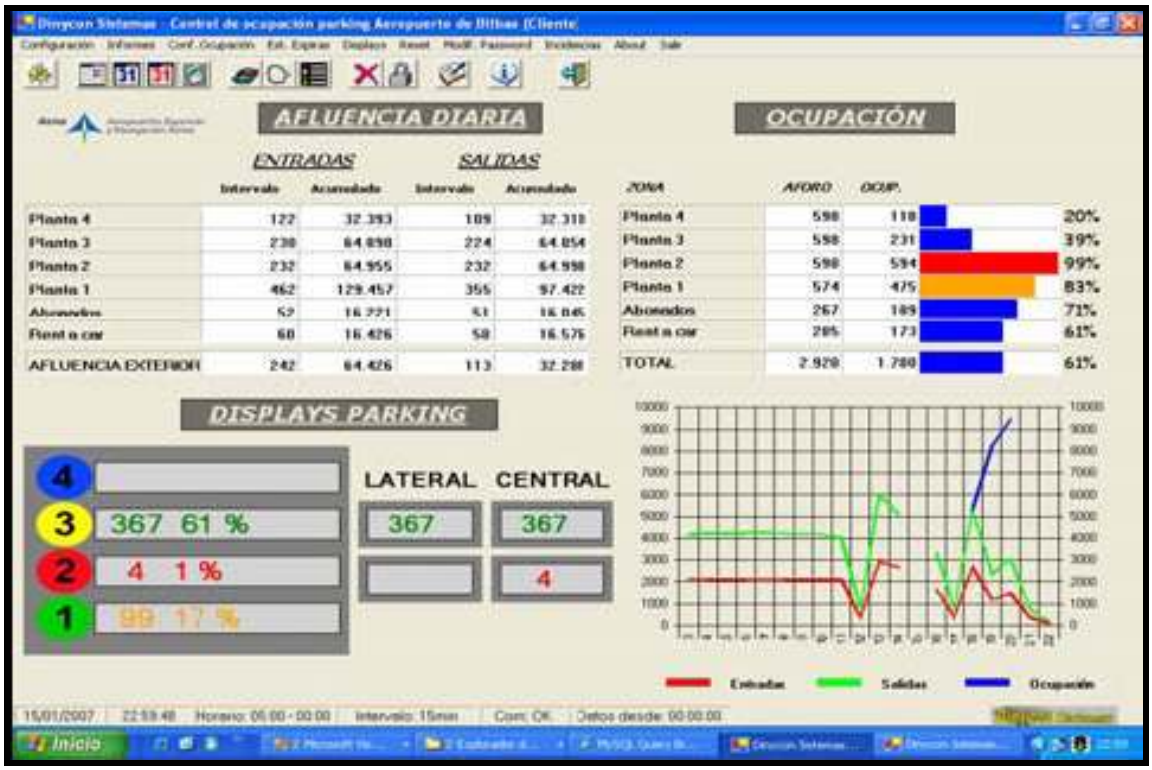


Fig 9. Generic screenshot of Data centralisation software

4.3.4 INSTALLED SIGNPOSTING

As mentioned in section 4.3, VMS panels were located at the edge of the city on the main entry routes and at strategic points in the heart of the city where their physical location was compatible with the existing urban street furniture.

In the case of parking availability information signposts, their location is partly determined by the VMS panels, as they set out the strategic routes. Unlike the VMS panels, their physical location is established within the city with the specific aim of bringing drivers to their particular parking destination.

In this sense, the information signposts relating to a single parking location tend to be located very close to the reported parking place, whereas the multiple parking panel signposts are located at intermediate points where it is still appropriate to show different alternatives.

In the following images we show some of both types of installed signposts, according to the definitive location plan shown in the city plan in ANNEX II.

Fig 10.VMS Panel at city entrance in Amara zone

Fig 11.: Information panels showing underground parking locations.

4.4 – Problems Identified

A number of problems were identified, including;

- Signpost location: We found difficulties to determine the optimum location of the panels because sometimes their installation could affect the width of the pedestrian route available and /or would impair the visibility of existing signposts (Traffic signposts, traffic lights). This is due to the spatial constraints encountered in consolidated urban areas especially at major crossroads where there is little available space since it is occupied by traffic lights, traffic signposts lampposts, trees etc.

  To solve this problem we have tried to locate the panels after the crossroads, in central reservations, in gardens with low vegetation.

- Parking facilities that, due to their location, maybe affected by road closures, or different city centre events, for example if the entry or exit lane is blocked as this situation would disrupt an automatic counting system for unoccupied parking places because the system would not detect vehicles on exit (unless the car park had a manual over-ride system and staff available to log cars on exit.).

  In those cases, the operator must manually report the occupation status of the parking facility.

4.5 – Risks and Mitigating Actions

Installation maintenance and electrical - telephone costs (data transmission): Any costs associated with system maintenance in the first year will be covered by a 12 month guarantee. Expenses would be shared between the installation company and the signposting team. The installation company will repair and fix all the aspects related to software and hardware of installed equipment, under the terms of the purchase guarantee on these issues.

The signposting team, currently responsible for signposting cleaning, will also be responsible for keeping the panels clean (stickers, dirt, etc…)

From the first year of operation, maintenance of the system must be included in the maintenance contract for traffic lights because the VMS panels' electrical connections are linked to traffic lights controllers.

4.6 – Next Steps

The research documented here has been used to define the system that will be implemented in Donostia - San Sebastian and which will be reported further in ARCHIMEDES Deliverable T75.1.

The next step will be the commissioning of the system, beginning to report the occupations of the Park & Ride areas and recording the evolution of necessary maintenance tasks.

Moreover, there will be a need to check the accuracy of information provided by the operator of parking areas affected by events which necessarily must report manually (manually enter data into the system, as identified in section 4.4).

Regarding user satisfaction levels, an on-street survey will be conducted throughout the city after the system has been commissioned.

ANNEX I

List of Information Panels. Content and Locations

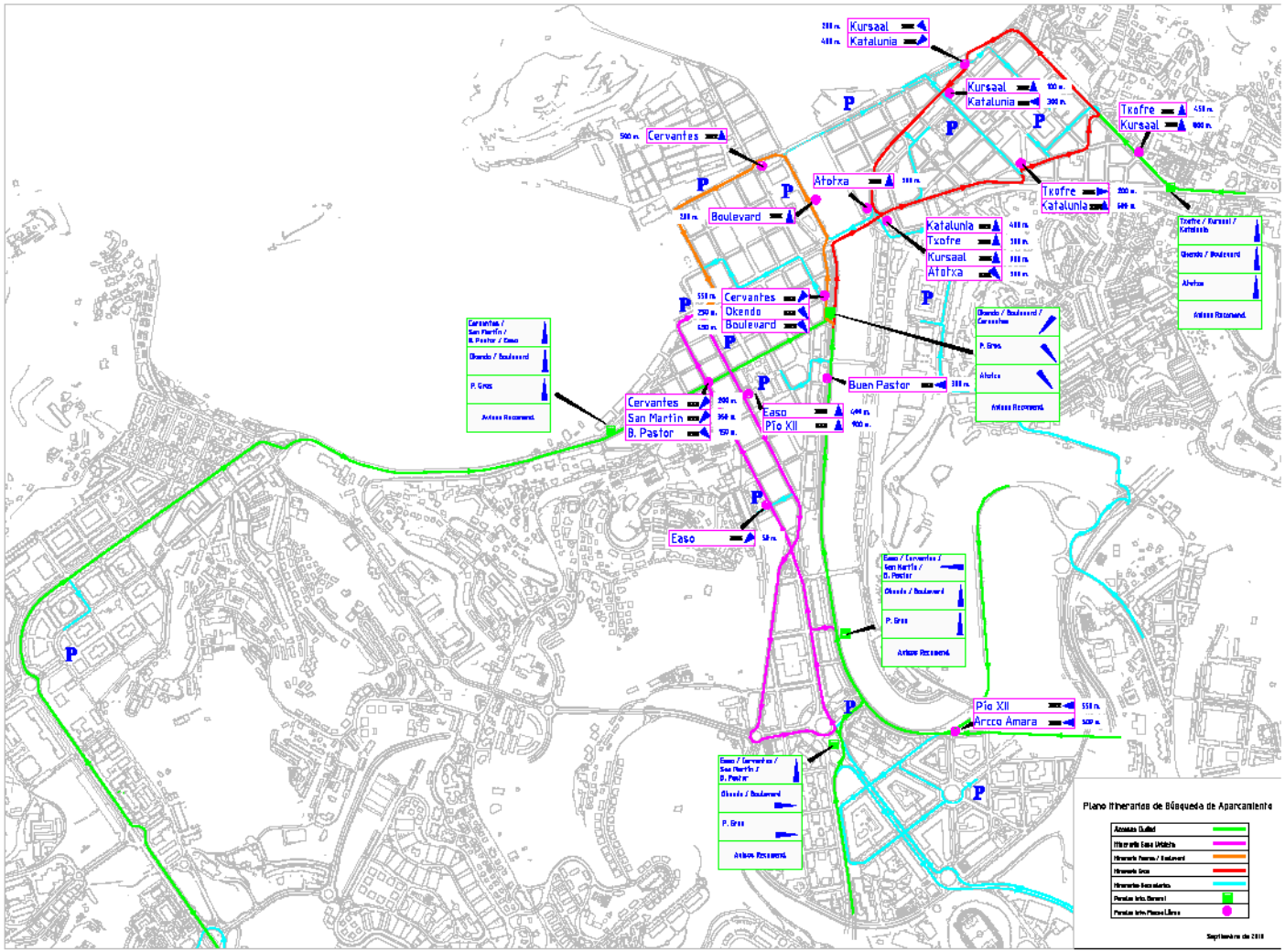
Paneles de Señalización Plazas Libres Aparcamiento Subterráneo

Nº	Ubicación		Panel		
1	Pº Árbol de Gernika - Valentín Olano	P	**Buen Pastor** 300 m	XXXX	←
2	Pº Fueros - Etxaide	P	**Cervantes 8**00 m	XXXX	↙
		P	**Okendo 2**00 m	XXXX	↘
		P	**Boulevard 4**00 m	XXXX	↘
3	Reina Regente	P	**Boulevard** 200 m	XXXX	↑
4	Reina Regente	P	**Cervantes** 700 m	XXXX	↑
5	Easo - San Martín	P	**Cervantes** 200 m	XXXX	↑
		P	**San Martín** 400 m	XXXX	↑
		P	**Buen Pastor** 100 m	XXXX	↘
6	Urbieta - San Bartolomé	P	**Easo** 400 m	XXXX	↑
		P	**Pío XII** 800 m	XXXX	↑
7	Easo - Pedro Egaña	P	**Easo** 50 m	XXXX	↙

Nº	Ubicación		Panel		
8	Plaza Euskadi	P	**Katalunia** 400 m	XXXX	↑
		P	**Txofre** 700 m	XXXX	↑
		P	**Kursaal** 900 m	XXXX	↑
		P	**Atotxa** 500 m	XXXX	↘
9	Gran Vía - José María Soroa	P	**Txofre** 200 m	XXXX	↘
		P	**Kursaal** 450 m	XXXX	↑
10	Plaza Lapurdi	P	**Kursaal** 300 m	XXXX	↑
		P	**Katalunia** 500 m	XXXX	↘
11	Gran Vía - Pº Colón	P	**Kursaal** 100 m	XXXX	↑
		P	**Katalunia** 250 m	XXXX	←
12	Pº Colón - Plaza Euskadi	P	**Atotxa** 600 m	XXXX	↑
13	Pº Bizkaia - Eustasio Amilibia	P	**Arcco Amara** 450 m	XXXX	←
		P	**Pío XII** 550 m	XXXX	←
14	Avda. Navarra - Pasajes	P	**Txofre** 400 m	XXXX	↑
		P	**Kursaal** 800 m	XXXX	↑

ANNEX II

VMS and Information Panel Locations: City Plan.


Kursaal
Katalunia
Cervantes
Boulevard
Atotxa
Okendo
Tkofre
Buen Pastor
Easo
Pio XII
San Martin
B. Pastor
Arrco Amara
Plano Itinerarios de Búsqueda de Aparcamiento