Descriptive report for preliminary consultation regarding the definition of e-displays at public transport stops.

0.- Introduction

The Pamplona Area transport service serves 340,000 inhabitants, generating 37.5 million journeys per year on the transport system. The network has 25 daytime lines and 10 nighttime lines, with more than 300 shelters and 225 posts.

At present, information on the transport system is provided by means of a modular system of printed signs affixed on both posts and shelters. These signs are customised for each line and direction of travel, which requires keeping a stock of around 200 different signs. These must be printed and installed on the relevant stop, each of which will have between 1 and 10 different signs. These signs are made of translucent plastic to allow backlighting.

Therefore, producing and installing the information involves a considerable cost. Every change in a timetable or route means reprinting between 15 and 40 signs for every line where changes have been made. Considering that some 3-4 service changes are made every year, each affecting around 4 lines at the same time, this means changing around 500 signs every year.

Looking for ways to improve this situation, the possibility arises of incorporating elements that can be updated automatically with low energy consumption.

1.- Initial Functionalities

Based on the fact that user information tends to be designed with a standard format, leaving no room for customisation, it would be logical to think that a system with a certain degree of dynamism in the display of information would allow the provision of information in a more dynamic, personalised and logical way.

In any case, it should be possible to provide information on the service at two different levels:

A. Information prior to the journey: allowing users to look up information on the transport system (lines and static timetables) and:
   - allowing easy updating from a remote location (transport operator headquarters)
   - providing a higher level of accuracy and information content than at present, given the expectations associated with a digital display.

B. Information on the journey based on the data supplied by the operation assistance system (OAS), allowing users to:
   - find out how long it will take for the bus to arrive
   - find out how long the journey will take.

How should the system be designed in order to provide both types of information in a simple manner, and what other information should, or should not, be included?

2.- Technology

There are mature technologies available in the market suited to this application (for example, coloured electronic ink with back lighting, very low power consumption LCD, touch-operated displays made from vandal-proof glass, solar panels for daytime power supply, batteries, etc.) which would, in principle be suitable candidates for the development of the system described above. Therefore, the aim is to determine the best way to support, by means of "user-transparent" technology, all the information cycle described in the previous section.

A. **Communications.** A one-way — or even two-way— communication system must be provided (incorporating other functionalities, such as stops on demand or any other type of interaction with the user).
B. **Display.** As indicated earlier, this is the most important part of the system, which will to a great extent replace paper (only the printed spider map of daytime and nighttime lines would remain at the stops). The most logical size would be A4, as this matches the size of the area designated for visual information on the post /shelter leg, which is where printed information is posted. The technology used, its power consumption and versatility are important factors. Electronic ink, LCD (low power consumption), etc.
C. **Power.** The power supply for the system is of critical importance, since a low voltage supply is not always available at the stops. However, power from the street lighting network is usually available. At present the options we favour are solar energy, overnight recharge batteries, etc.
D. **Interaction.** For the information to reach the user, the system must allow users to look up information quickly and easily. Therefore, two buttons must be provided for browsing the interface; alternatively, another solution would involve incorporating a touch-screen function.
E. **Protection.** The system's exterior should be resistant enough to ensure its durability: vandal-proof glass, secure enclosure locks, etc.

¿How should a combination of the technologies described (communications, display, power supply, physical interaction and protection) be established in order to develop a proposed solution meeting all the functional requirements of the system? Is any other technology required in order to specify the system?

3.- Backup system

To provide the information on the system, a system must be set up that, drawing from the currently existing alphanumeric databases, automatically generates an alphanumeric and graphic information repository. Such information must be updatable and in a format similar to the current one: (https://www.infotuc.es/descargas/fichas/4_1.pdf).

What are the most suitable tools to develop this kind of systems capable of generating the information in an automated manner?

4.- Potential areas of improvement.

What improvements could, in your view, be incorporated to the system, either solutions currently available in the market or others that could be incorporated within one or two years?