

GUIDELINES FOR INFORMATION SYSTEMS

André MERIAUX
INFOPOLIS Project Manager
CETE Méditerranée
BP 37 000 - 13 791 - Les Milles - FRANCE
☎ 33 (0)4 42 24 77 35
Fax 33 (0)4 42 24 77 80
a.mériaux@ceteaix.equipement.gouv.fr

SUMMARY

Due to the high heterogeneity and rather bad level of understanding of Public Transport telematic Systems all over Europe, the European Commission decided to supervise an important programme aiming at improving the Ergonomics of such systems. The INPUT Task Force constituted a first approach, and gave first recommendations for a better user's access to Public Transport Information. Following the INPUT Task Force, the project INFOPOLIS intends

- to improve the quality of electronic intermodal traveller information and facilitate modal shift (from private car to Public transport) in European Cities*
- to improve the usability of telematic information systems (through the ergonomic presentation, and the introduction of new features*
- to enable the greatest number of users to have access to a well-adapted and homogeneous family of tools*
- to reduce social or physical disparities by integrating the special needs of Elderly and Disabled People*

FROM THE INPUT TASK FORCE TO... INFOPOLIS

Nobody will contest the necessity of improving a reasonable level of harmonisation in Public Transport Telematic Systems. In fact, this can be considered as a guarantee for a better effectiveness of Information Systems and, therefore, a sizeable increase in patronage or, at least, the continued loyalty of passengers. This also can be considered as one of the very highest important conditions for a good translation from private car to PT network.

The research for a better harmonisation in PT Information Systems has begun with some very specific actions in the field of the ergonomic researches, and especially with the **Input Task Force**, led in 1995, and then with the **INFOPOLIS Project**, from 1996.

THE METHODOLOGY APPLIED






















• The main objective of the INPUT Task Force has been to develop common specifications for the display of information to the travelling public about public transport services. From the outset, the Task Force chose to limit its scope to the study of the human-machine interface, i.e. the actual presentation of the information on the screens. Three types of display units have been considered:

- At bus stop displays
- Enquiry office terminals
- Public access terminals

The Input Task Force gathered common work assembled over several months by **experts** from different European countries, and representative of various disciplines in the transport environment: authorities, research workers, technicians, managers, officials.

The Task Force defined three layers in the presentation of information on the screen:

- The **superficial or graphical layer** which is the level of the physical objects of the interface: characters & fonts, icons, buttons, colours and the screen layout;
- The **intermediate or representation layer** which contains user terminology, metaphors, solution presentation, map presentations, etc;
- The **Deep or Interactivity layer** which classifies the dialogue structure, dialogue request, map manipulation (moving & zooming) and communication tools (touch screen, tactile keys, etc.)

 Screen size	 Terminology	 Structure of dialogue
 Characters	 Menus	 Trip planning request dialogue
 Icons	 Metaphors	 Timetable request dialogue
 Buttons	 Trip planning presentation	 Map manipulation
 Colours	 Timetable presentation	 Interactive communication tools
 Display layout	 Waiting time presentation	 Choice of language
 Screen layout	 Map presentation	
 Implementation environment		

• Graphical layer

• Representation layer

• Interactivity layer

figure 1: the 3 layers in the presentation of information in the INPUT approach

The INPUT Task Force has formulated recommendations on the design, structure, location, the use of colours, etc. of information systems to the public. Five levels of «harmonisation» have been defined: «proposed to be standardised», «firmly recommended», «guideline», «not totally free», to «total freedom» (i.e. no standard is needed). However, it is clear **that not all aspects of information systems can be standardised** (since the applied technologies impose their own limitations and often

restrict the use of certain colours, and character types, etc.). So only 8 proposals for standardisation have been detailed:

1. Screen layout for bus stop display
2. Waiting time mode of presentation for bus stop display
3. Use of buttons for public access terminal
4. Use of icons for public access terminal
5. Screen layout in public access terminal
6. Languages in public access terminal
7. Use of icons for enquiry office terminal
8. Terminology for enquiry office terminal

Following the Input Task Force, **INFOPOLIS** tried to propose some guidelines drawn from the experience of evaluations carried out on a lot of existing systems all over Europe, and from the observation of the user's behaviour. The INFOPOLIS recommendations concern 6 different families of systems. They were expressed in consideration of the real user needs approached during the different surveys in live situations.

For convenience sake, the INPUT and INFOPOLIS guidelines are hereafter presented by **family of system**.

PUBLIC ACCESS TERMINALS

The location of PAT

- It seems very necessary to **inform people well** about the existence of the PAT systems, their capabilities, and the **location** of the units. One of the first recommendations should be to provide good signs showing both the location of units and the way to them. Regarding the situation of units, we have to think about the **orientation** (in relation to sun / light), and the number of terminals available on-site. It seems also necessary to **avoid places with too much pedestrian traffic**.

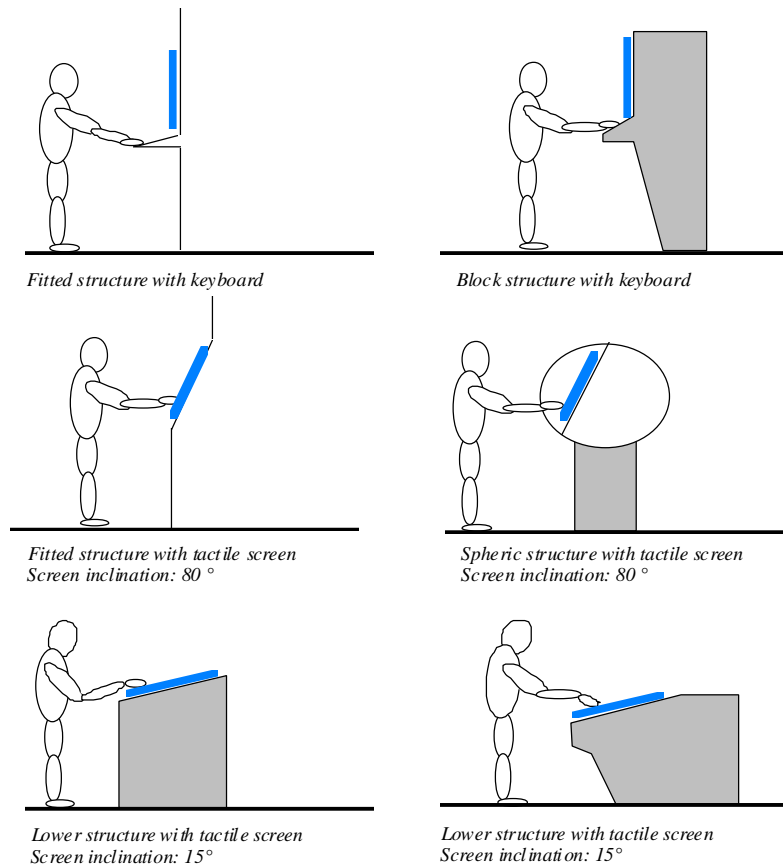


figure 2: recommendations for installation of PAT)

The Interactivity layer in PAT

• Regarding the **interactivity layer**; it seems of importance to agree as well as possible with **user needs**:

- provide an **immediate feed-back** to the user; give in advance **the waiting time for an answer** (some live tests have proved user's discouragement - often more than 20% for some PAT - during which they are waiting for a response)

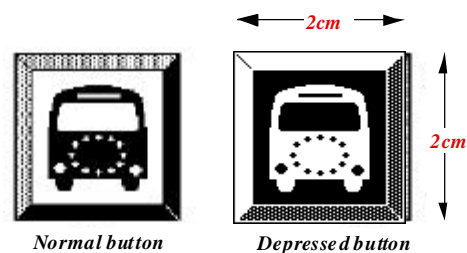


figure 3: guideline for size and feed-back system for PAT's buttons

- **limit** the number of operations; optimise the input procedure.

The presentation of the information on screens

- Provide clearly understandable **screens**: not too much information on the same screen, not too many zones, avoiding publicity...
- Organise the **screen structure** according to the importance and the role of each constituent element: each zone dedicated to a specific nature of information or dialogue object.

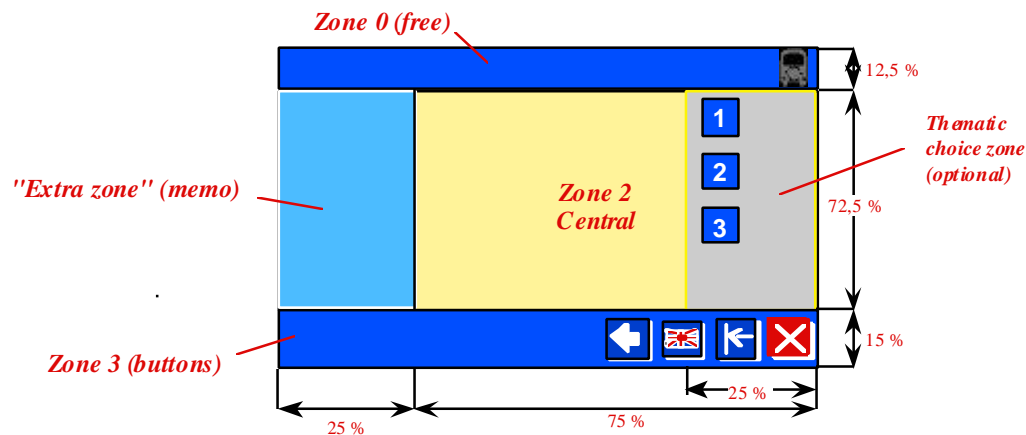


figure 4: guideline for an organised screen structure in PAT

- Avoid incomprehensive **fonts**; use « standards » fonts (such as Helvetica, etc)
- Standardise whatever can be standardised and respect standards. Use standardised **colours** (norm *ISO 9564*): generally red for « cancel », green for meaning « permission », or « validation », etc...

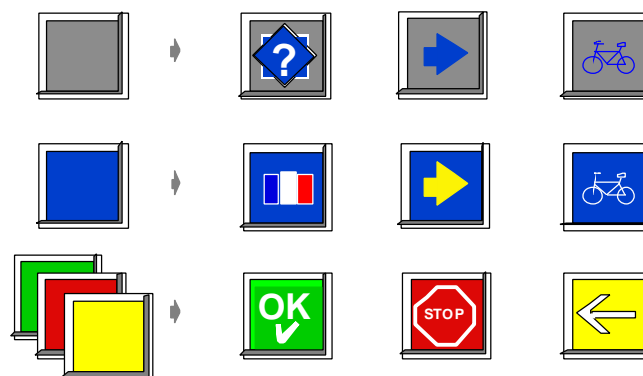


figure 5: examples of guidelines for recommended colours in PAT's screen

- Present **graphic trip solutions** as a synoptic view of the trip, including schedules, addresses, means of transport (icons), and given chronologically.

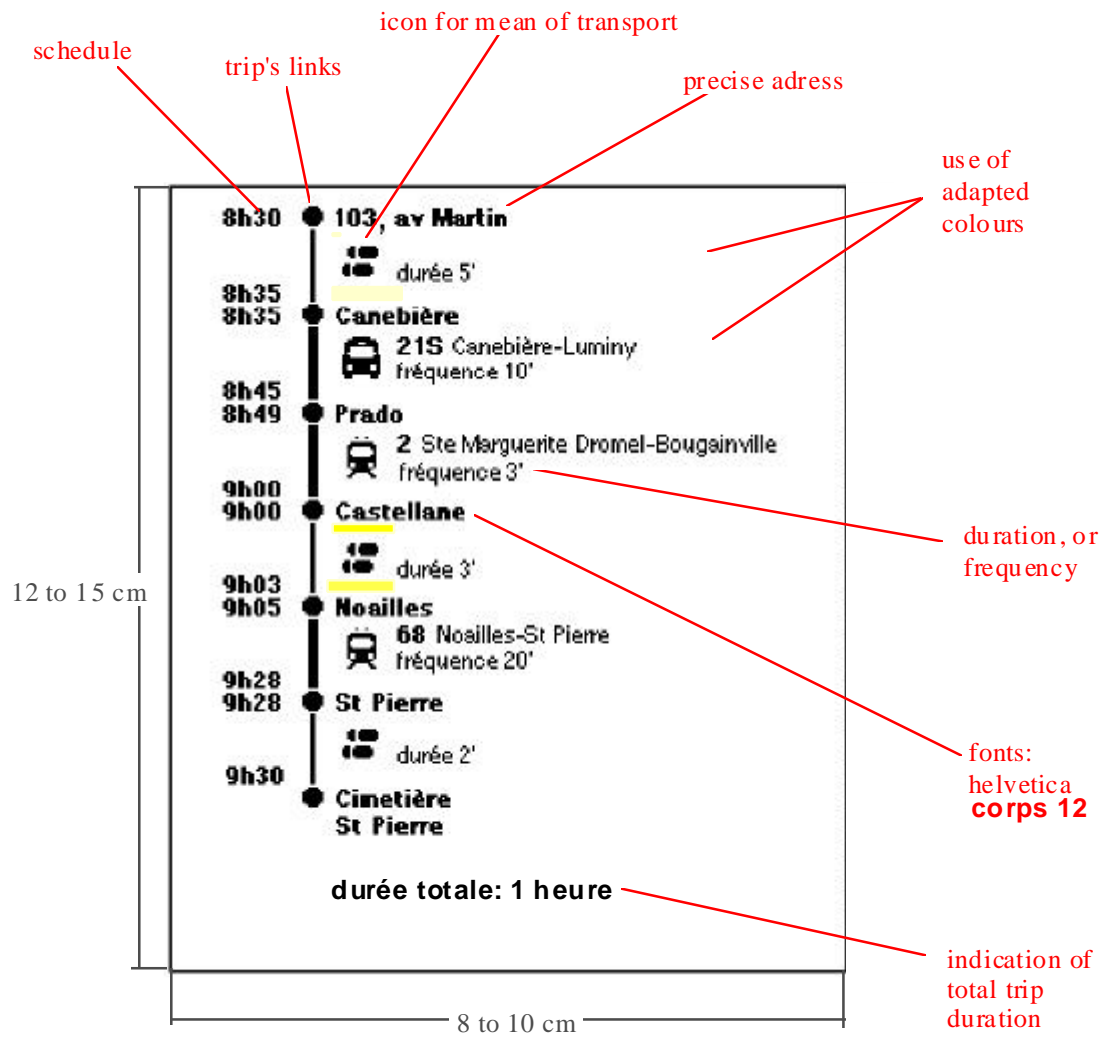


figure 6: guidelines for the presentation of a trip solution

STATION AND BUS STOP DISPLAYS

The location of Displays

- Wherever possible, improve the display position, with respect to nearby structures and general **visibility** conditions. Position the screen inclination at an appropriate angle. Take into account the readability and legibility of information displayed.

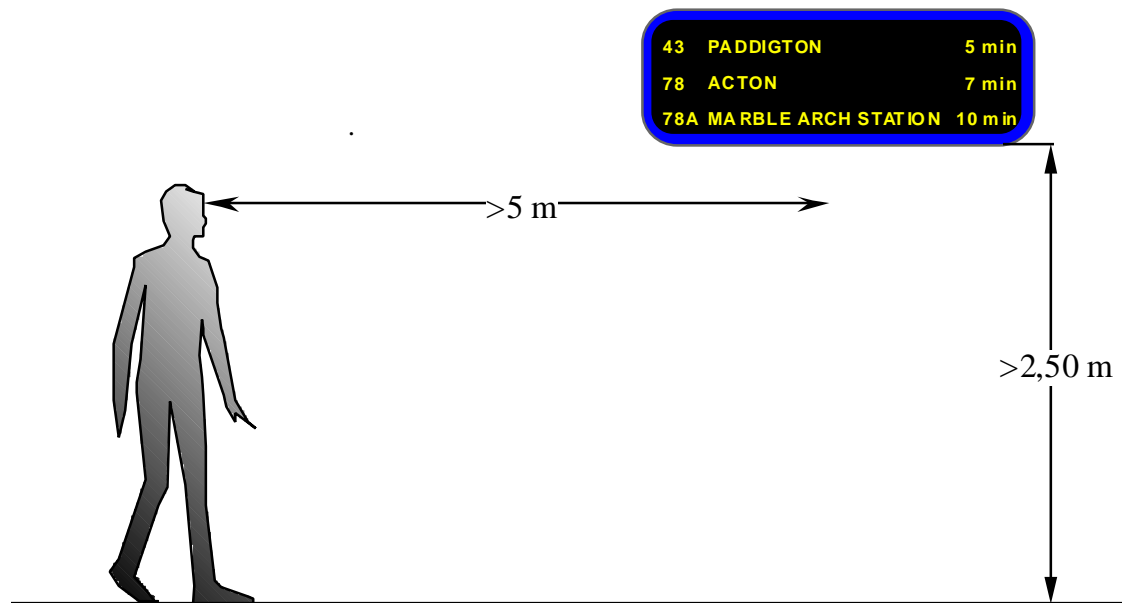


figure 7: guidelines for positioning real time display

Readability, legibility

- Improve readability of displays; avoid publicity on screens. Use recommended basic fonts (such as Helvetica). Use the same fonts as in On-Board Screens (question of homogeneity). Use an appropriate size of character:

$$\text{Height (cm)} \times 2 = \text{average reading distance (m)}$$

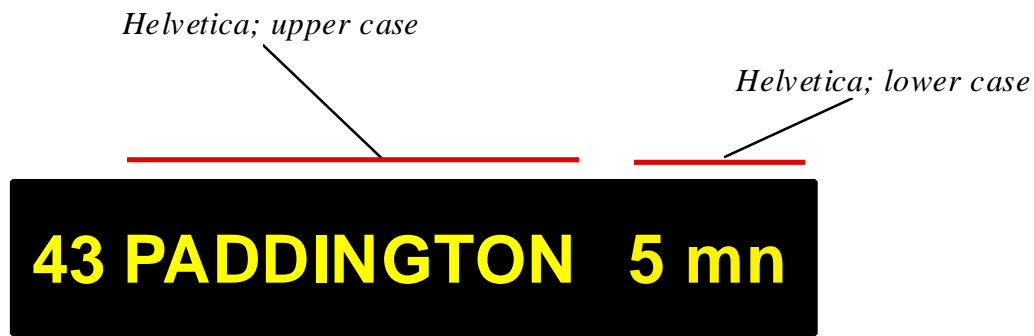


figure 8: recommended fonts for real-time displays

L.E.D.	Red upon black Yellow upon black	<div>5 mn</div> <div>5 mn</div>
L.C.D.	Black upon white Black upon yellow	<div>5 mn</div> <div>5 mn</div>
Flip Flap Dot	Yellow upon black	<div>5 mn</div>

figure 9: recommended colours for real-time displays

Harmonisation; standardisation

- Harmonise and standardise elements such as **sequence of information**, relative position of first to last information displayed; 3 main elements on the display:

- route number
- name of main final destination
- waiting time info.

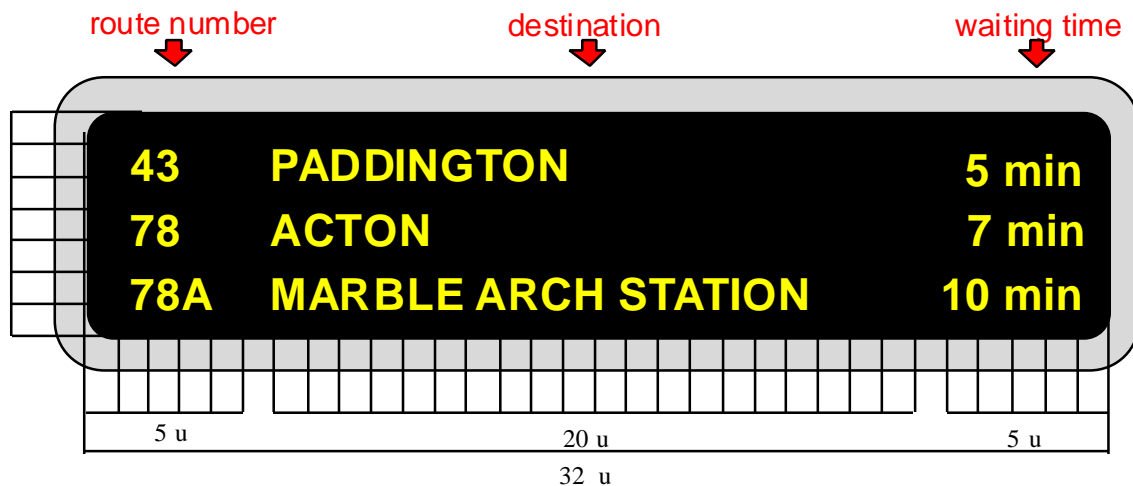


figure 10: guideline for a standardised presentation on display

ON BOARD DISPLAYS

General guidelines

- Improve wherever possible the display position, with respect to nearby structures and general **visibility** conditions. Position the screen generally in upper parts of the vehicle. Avoid positioning against the light (i.e. near the windscreen).
- Provide **audio-information** alongside visual information.
- Harmonise and standardise elements, as for Bus Stop Displays. Try to **harmonise** the content of Stop Displays and In-Board Displays.

HOME TERMINALS

Taking into account user needs

Generally, home terminals are conceived as if the designer had taken only the system needs into account, rather than the user's ones. Now, we should concentrate on the real concerns of users, especially for the following:

- Develop user-friendly **interfaces** so that a « simple user » can understand
- Involve futures users in the **design** process

- Provide on line help and **guidance** to the user
- Create and implement systems with low subscription, connection, and usage costs.

Harmonisation; presentation of trip solutions

- Harmonise and **standardise** where possible, especially in the User Interface elements.
- Provide reasons for manufacturers, PT operators, and service providers, to adopt guidelines and good examples.
- Improve **response time**
- Provide **alternative trip solutions**, especially taking into account different criteria (time, cost, transfer, etc)
- Provide fare information and the cost of alternative solutions.
- Pay particular attention to **intermodal solutions**, and presentation of possible links between different means of transport.

HANDHELD TERMINALS

Taking into account user needs

Such kinds of systems nowadays become more and more attractive. Most users probably prefer integrated technological solutions, giving in the same portable many functions: real time information on the network, automatic reservation for shows or the theatre, for rooms in a hotel, mobile phoning, general information about a town, etc. .Probably these kinds of systems are for the future rather than for now. Some technologies, such as Nokia for instance, seem particularly attractive. But once again, such systems require a very high **ergonomic level**, taking into account most user needs. Some recommendations can be given:

- Adapt the software well to the **logic** of the users as people using transport are not expert in computing (even in younger age groups)
- Improve the **legibility** of the screen by presenting only relevant information to users (in certain cases this will allow an increase in the **size** of the characters)

- Involve users in the **design** of the units
- Think about the weight, size, **battery** capacity
- Minimise terminal and service **costs**
- Use well identifying **icons**, and, if any, well standardised **colours**.



figure 11:Infobus Pager © JC Decaux

ENQUIRY OFFICE TERMINALS

General Recommendations

- Involve future users in the design process in order to favour user acceptance
- Provide a flexible operating system (several ways to achieve the same result); make the dialogue more compact (eg: one screen for entering all the request components)
- Improve system response time; provide very quick responses
- Short cuts between different menus; limit data entry; provide immediate feed-back

Trip solution; timetable and map presentation

- Provide schematic and geographical solutions; provide a button for **return trip**
- Give the **fare** corresponding to the calculated route; display the **duration** of the trip

- Display timetables inside spreadsheet; **scroll bars** allow easy movement inside a timetable: horizontally (access to different time slots), vertically (access to different points of a line)
- Use contrasting **colours**; give a legend to the map; give the opportunity to remove the map from the screen; give tools to zoom and move the map; allow user to choose what kind of objects he / she wants to display on the map.

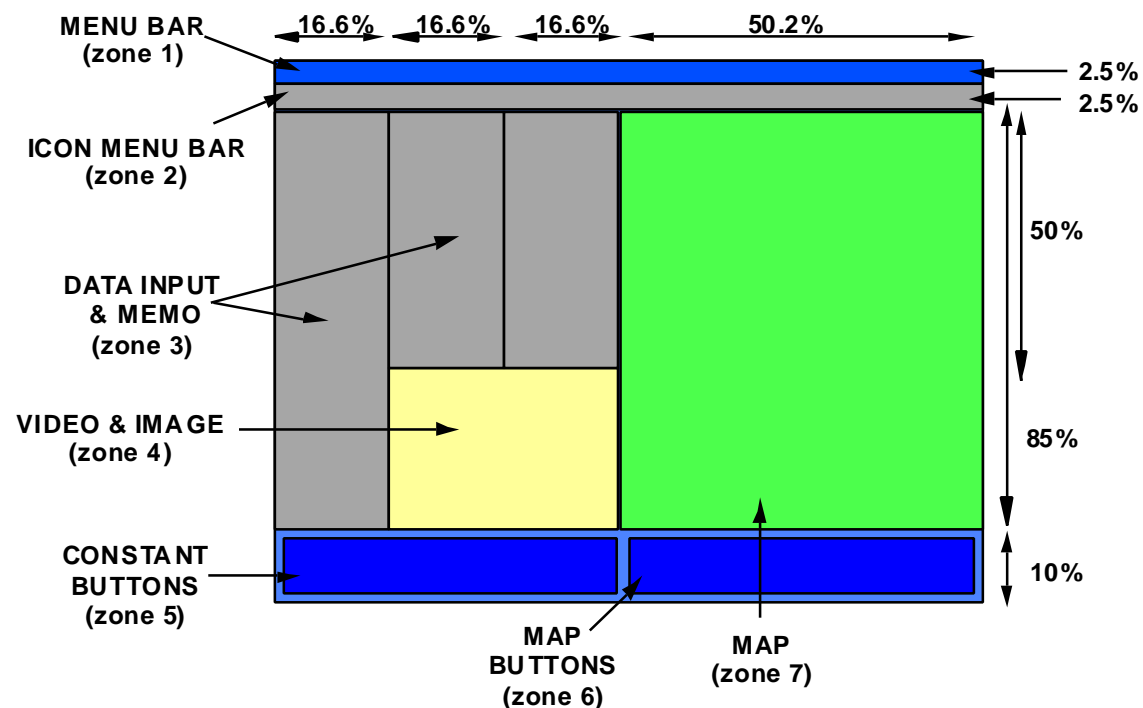


figure 12: recommended structure of screen in EOT

FROM INFOPOLIS TO... INFOPOLIS 2

INFOPOLIS 2 started in the beginning of 1998. New families of systems are being to be tested: real time variable message signs and in-car terminals. In another respect, INFOPOLIS 2 will concentrate exclusively on Intermodal Public Transport Information. New mockups will be tested by users. The results of tests will allow the production of complete guidelines for systems designers, in which the specific aspects of Elderly and Disabled People will not be forgotten. It will also be constituting a databank of existing systems, and ergonomics approaches, an Observatory of traveller's needs throughout the complete chain of information, and an « Information Exchange Hub » available through a Web Site. An active dissemination of results should constitute the true basis for a real and effective collection of standards at a European level.

CONCLUSIONS

Over the last decade, information systems on public transport services have known an explosive expansion all over Europe. This is due to the fact that more and more public transport operators are becoming aware of the necessity to create a positive picture concerning their services. Clients, too, become more and more aware of the many possibilities offered by public transport in general, but particularly as an alternative to the everyday more and more crowded private road traffic.

It is therefore of the utmost importance to provide the most accurate and up-to date information to the user.

In addition to the more than 300 web-sites containing information on public transport services, there are at least 150 telematic-based public transport information systems currently in use in Europe. They are based on 25 Public Interactive Terminal systems, most of which give static timetable-based information, 11 different Enquiry Office Terminal systems, in operation in a large number of cities, and 3 Home/office Terminal systems, also operational in different countries.

A harmonised and uniform presentation of this information on the different systems spread all over Europe is a key element in raising the attractiveness of public transport in order to achieve a certain percentage of modal split. This is the main aim of INFOPOLIS 2.

The discussions during and after the presentations raised a large number of questions and comments, and the following key points emerged:

- One of the most important elements in the success of the implementation of a public information system is the reliability of the information. This is especially critical for real-time systems.
- A classical mistake is to put into public operation, as a result of pressure from government authorities, systems that are still not fully developed, and which have not yet achieved required reliability standards.
- At-stop real-time displays should be placed in such a position that the traveller is facing them as he is looking in the direction of the expected vehicle. Another important aspect is the contrast: - when looking at the display the user should not be dazzled by bright light.
- A basic principle of system implementation is to ensure that drivers accept it, by involving them from the beginning and explaining how it will help satisfy the customer.
- Vandalism is an important issue, but can be significantly minimised by good system design and testing. Circuit breakers to switch off the system in case of malfunctioning are an important system element.

Future developments in information systems directly relevant to intermodal travel were mentioned, including:

- Multi-media screens combining commercial announcements and entertainment with passenger information. Commercial elements can finance a

whole system, with the right partnership; and this principle has already been used in Madrid to fund information kiosks.

- The inclusion of touch screens on video telephones, making it possible to obtain public transport information on any video telephone.
- A special service using portable GSM telephones giving subscribers an automatic call when a service disruption occurs on a route previously specified by the user.
- The development of interactive kiosks with real time information (currently none exist in Europe).