

The European Information Portal

Information Design for the Channel Tunnel

MA Information and Graphic Design
De Montfort University (Leicester)



A Study by:

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'Information communication' is one of the major contributors to keep travellers moving in the right direction on British transport systems. With a united Europe becoming more realistic, and the borders now gradually being lowered *information design* will therefore become more important in crossing language, cultural and barriers related to disability than ever before.

With the inauguration of the Channel Tunnel a new era of transport has, after 200 years of plans and failures, is likely to stay. With a predicted 43.9 million passengers passing through the tunnel by 2003. The unhindered flow of passengers and freight is therefore vital throughout the networks surrounding and using the tunnel.

It appears with most new, and improving transport networks the degree of provision and use of information to reduce *anxiety* is an 'unknown quantity'. Certain aspects of information may be required to alleviate this *anxiety*, and more importantly make people understand and react to decision making situations easier.

The main objectives of this study have been to research into the possibilities for an 'interactive information system' for the Channel Tunnel. To find out if there would be an opportunity through a client, interested party or financier to aid this study and help implement such a facility.

The designs produced, so far, have received a positive response. The problem areas revealed are fairly consistent as indicated by the people who have viewed the designs so far. The proposed information areas to generate a more detailed screen design are in the study. Further convincing is required however, through a full working prototype with sound, speech and video footage. Therefore the aim '*To convey information that cannot be achieved by printed media alone*' cannot be wholly substantiated, although, with the information provided and potential information in the study to be injected there may indeed be too much for printed media to give a clear and unconfused message. Further information into how people read and perceive graphic material is required for further development.

The information in this report from European Night Services (ENS) about the 'Night Train' is confidential and has not been publicised. Therefore the information regarding the 'Night Train' must not be discussed outside the confines of this project.

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The interest in information design and multimedia has developed from my graphic design course at Ravensbourne College of Design and Communication in London. The idea for an interactive system for the Channel Tunnel came from a BA project to design interactive screens for BAA airports. To produce a familiar looking interactive system in a way which would attract people rather than frighten them.

From the development of my Masters degree project it is my intention to develop and produce a designed system which would operate clearly, concisely, and be simple to use for revealing Channel Tunnel information. With my existing professional skill in graphic design and my potential knowledge of interactive information and multimedia systems this will become a more realistic aim.

Acknowledgments

I would like to thank all the people who have helped with the development, guidance and evaluation of this project, to family, friends, tutors and individuals in the industry who have aided and encouraged me to the end.

All your help has been most appreciated.

Cartoon extract from... The Daily Telegraph Tuesday
November 15th 1994 (News p11)

Introduction: *The opportunity*

1.1 The channel tunnel

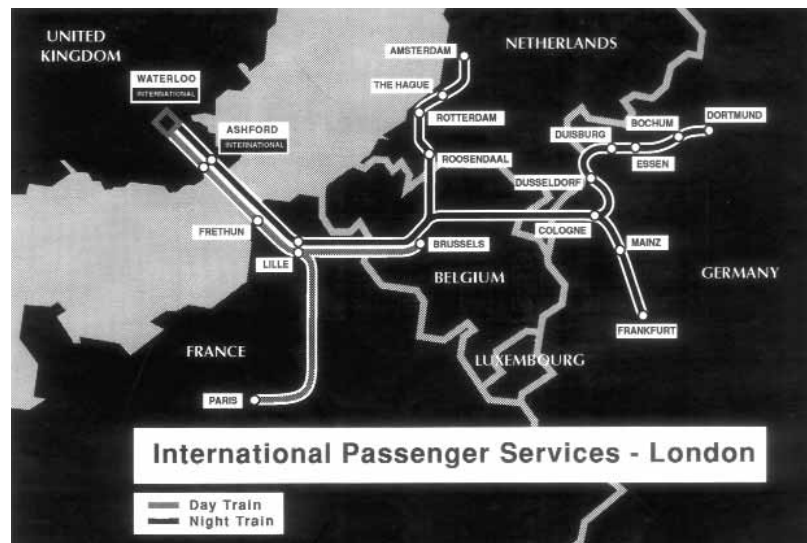
The idea of a fixed link between Britain and the European Mainland was first seriously considered in Napoleonic times. Since then plan after plan has been suggested. A tunnel was even started in 1880, only to be stopped two years later after British fears of invasion became too great. A full abridged history of the tunnel attempts, problems and achievements appear in *Appendix 1*.

The Channel Tunnel project has been one of the greatest engineering projects ever undertaken, being skilfully constructed in seven years. The tunnel is 49.5 kilometres long and between 25 and 45 metres below the sea bed, so travelling for 35 minutes in with those thoughts in the darkness one can only tentatively predict the varying psychological effects on passengers.

Fig 1
Inside the tunnel



Fig 2
The European Passenger Train Routes



The system, in essence, is a railway of which the two larger running tunnels are now completed and fully working and carrying trains. The tunnels are the heart of the whole system, being *two large running tunnels* which carry the railway lines between England and France and there is a smaller *service tunnel* separating them which has its own mini purpose built transportation system (Fig 3).

The two large running tunnels will carry *high speed mainline passenger and freight trains* between England and the European mainland, as well as the special *Le Shuttle* trains loaded with vehicles and their drivers and passengers.

At either end of the Eurotunnel fixed link system between England and France, two huge terminals have been built from scratch. Where there were once fields, track has been laid, platforms, access ramps and overbridges constructed.

The whole project has been unique because of the sheer scale of European cooperation between England, France, and the extended night train operation between British, French, Dutch and German railway companies with Belgium allowing trains to use its rail network.

1.1.2 Channel Tunnel related companies

Trans-Manche Link (TML) (Fig 4)

Trans-Manche Link (TML) is the contractor responsible for designing, constructing and commissioning the Channel Tunnel, acting on behalf of its client Eurotunnel, a totally separate entity. TML is a consortium of ten major construction companies: five British;

- Costain Civil Engineering Ltd
- Balfour Beatty Construction Ltd
- Tarmac Construction Ltd
- Taylor Woodrow Construction Holdings Ltd
- Wimpy Major Projects Ltd

...and five French

- Bouygues SA
- Lyonnaise des Eaux-Dumez
- Societe Auxiliaire d'Enterprises SA (SAE)
- Societe Generale d'Enterprises SA (SGE)
- Spie Batignolles SA

While TML exists in a liaison capacity to co-ordinate the project, two separate companies were formed to carry out the work on their respective sides of the Channel: *GIE Transmanche Construction* based in Calais and *Translink Joint Venture* whose head office is at Shakespeare Cliff.

Eurotunnel (Fig 4)

Eurotunnel will own and operate the Folkestone / Calais fixed link once TML has completed its work.

European Passenger Services

European Passenger Services (EPS) are a subsidiary company of British Rail. They are producing and will be running the 'Eurostar' passenger service initially between London – Brussels and London – Paris during the day.

European Night Services

European Night Services (ENS) are a subsidiary of EPS and are in the process of organising a passenger night service which is a joint venture between British, French, Dutch, German and Belgian railways.

“Proposals to establish a network of overnight passenger rail services between Britain and the Continent are expected to be approved by European Community competition officials later this week. The new international sleeper service, which will link Glasgow, London, Swansea and Plymouth with a variety of continental destinations via the Channel Tunnel, will be the first attempt by Europe’s state owned rail organisations to challenge air transport’s domination of the long haul passenger market.

Five services will be on offer, including London-Amsterdam (9 hours), London-Frankfurt and London-Dortmund (11 hours), Glasgow-Paris and Glasgow-Brussels (12 hours), Plymouth-Brussels and Swansea-Paris (11 hours). Further routes could be added later.

The services, expected to come into operation in 1994 or 1995 are regarded as important by business interests in Scotland, Wales and the regions, where anxiety is acute that the benefits of the Channel Tunnel will be limited to London and the South-East.” (Dynes 1992)

1.1.3 The Trains

Le Shuttle, (*Fig 5*) the Folkestone to Calais fixed link train is designed to haul 20 shuttles a day with vehicle passengers in specially designed single and double decker carriages. When loaded it will pull up to 2400 tons at speeds up to 90 mph. The locomotives work in pairs through the tunnel and any of them must be capable of restarting the train.

Eurostar (*Fig 5*) is the main passenger service. Most will transport people between London and Brussels and London and Paris 15 times a day with stops at intermediate stations. The remaining seven will run north of London to Birmingham, Manchester and Edinburgh.

The **ENS Night Train** will be the passenger only overnight service. Similar to the Eurostar, the night train has newly designed carriages and sleeper cabins. People will travel through the tunnel during the night on trips of greater distance than the Eurostar.

Railway companies have planned to operate 50 **freight trains** per day through the tunnel. The tunnel is expected to lead an increased amount of freight between the UK and continental Europe. It is also expected to bring about an environmental improvement by replacing diesel lorries with electric trains.

A new **Class 92 locomotive** has been specially designed for the job of hauling *freight* and *sleeper* car trains through the tunnel.

Service locomotives are used for maintenance trains and also in pairs for rescue duties if necessary.

1.1.4 The Terminals

The huge fixed link terminal at Coquelles near **Calais (Fig 6)** is larger than the total area of Heathrow Airport. It is the starting point for *Le Shuttle* car, coach and motorcycle services to Folkestone. On arrival through the toll plaza, vehicles will enter French and British frontier controls and security checks before loading on to the passenger vehicle shuttles via the loading bridges. The passenger terminal building will contain a range of shops, eating facilities and toilets. Lorries will enter the terminal through a separate toll booth before loading on to the HGV shuttles.

The British fixed link terminal at Cheriton near **Folkestone (Fig 6)** is just 2.5 kilometres long and 900 metres wide, about a fifth the size of the Calais terminal. Entering the terminal through the toll plaza cars, coaches and motorcycles go through the centre of the terminal before loading onto their shuttles. Lorries, again, will follow a separate route to cars through frontier and security controls before loading onto the HGV shuttles. As with Calais, the passenger terminal will contain shops, eating places and toilets.

When stepping into the passenger terminal of **Waterloo International (Fig 7)** in London, you enter a world of high technology that is also strikingly attractive. Architecturally it is inspiring carefully designed by *Nicholas Grimshaw and Partners*. It is the first gateway to a new golden age of travel in Europe. The beautiful web like roof structure spans five platforms and is 400 metres in length. The departures lounge has shops and a cafeteria and there is a separate first class lounge.

At the Parisian end is **Gare Du Nord** where the Eurostar will terminate initially once the route is open for business in 3 hours.

At the present time, journey time between London and **Brussels Midi** will be 3 hours and 15 minutes. With the introduction of the high speed line between Lille and Brussels the travel time will reduce to 2 hours and 40 minutes.

The planned **Kings Cross International** terminal (*Fig 8*) will be Central London's second international Terminal linking;

- *International services*
- *Intercity services*
- *Thameslink services*
- *London Underground*

Kings Cross International will radically reduce journey times for direct international services from Scotland, the North and the Midlands to mainland Europe. This terminal will provide high speed access to the Channel Tunnel by

1.2 Multimedia

So what is Multimedia?

There have been a number of different names in the past related to areas of multimedia, some which may be familiar, namely;

- dynabook
- cyberia
- hyperland
- intelligent tv
- multimedia
- hyperspace
- cyberspace
- infinite virtual address space
- interactive television
- interactive multimedia



Fig 9
Ted Nelson pioneer of Hypertext

Today's definition of multimedia can be a number of things, but is most often referred as the simultaneous use of more than one media type on a computer.

The basic types of media available on a computer are; text, graphics, animation, video and sound (including music). 'Another part to many multimedia productions is interactivity, that is, the capability for the user to interact and participate with the multimedia production, causing things to happen or interrupting the flow of information' (Murie 1993).

The idea of information storage and retrieval have been thought of as long ago as 1945 by President Roosevelt's science advisor Vannevar Bush. He had an idea called the *Memex* in which all the information of all publications of all fields be placed on *Microfilm*.

In the 1960's American Ted Nelson (**Fig 9**) developed the idea of *hypertext*. This can be described as the linking or threading of text to help communicate knowledge. Ted Nelson says 'in my study in the fall of 1960 in the unifying world there will be a storage mechanism structure and indexing system by which any one can add documents to the ever growing pool, and their own style of indexing. The repository needs to be somewhere where everybody can reach electronically through the telephone, perhaps through laser beams and satellite, but through various electronic means so that to our computer screens we can bring the material we want as fast as we need it, and this has to be available to everyone everywhere, and of course because of its literary tradition and because it is the magic place of literary memory it has to be called *Xanadu* (Adams 1990).

In some respects, hypertext is like a computerised footnote.

From the 1970's onward there have been a number of people working at the Media Laboratory in the Massachusetts Institute of Technology in the United States. Here a Swedish man named Hans Peter Brondo invented the motion icon or *micon*. Basically it is a sequence of frames run in a loop on a stationary icon which represents an idea or a concept.

Into the 1980's when the idea of multimedia began to take off the Multimedia

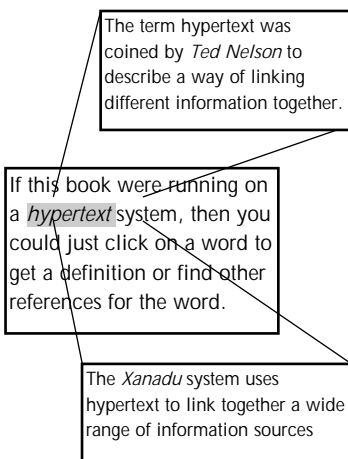


Fig 10
The basic idea of hypertext

Laboratory in San Francisco was set up where people took the research to the next stage of development and design.

Early Applications

An American professor of music called Robert Winter developed an Interactive version of Beethoven's ninth symphony in 1989 to help people to view, study, and understand music using a visual structure. He says that music is structure over time and is therefore easily and instantly available to view digitally.

A man named Robert Abel developed an interactive version of Picasso's painting Guernica (**Fig 11**). He says that through accessing the painting and the related elements surrounding the destruction of the Spanish town opens the door to thousands of different experiences from different areas relating to it. There are interactive applications appearing for many different areas, for home computers, for business and shopping use, for information storage and retrieval, for navigation and travel, for entertainment, and most recently for tourism. Multimedia is an application with thousands of uses. The potential is there to be discovered and designed responsibly.

Fig 11
Guernica Interactive



This is a video screen shot
(apologies for the quality)

The Proposal

Information may be given in many forms. This can be said to be true of transport and travel information. The information required by each individual to achieve the same objective can be different. However, travel still evokes a degree of 'anxiety' in people. To combat this, sign and mapping systems have been improved, for example the London Underground (*Appendix 4*). In addition to this time-tabling has become more categorised and with the introduction of 'self help points' technology has taken information to the 'interactive' level.

Even the thought of the words 'Channel Tunnel' evokes anxiety. Thirty-five minutes underground in the dark, beneath a vast body of water with the chance of flood, fire and terrorism, it is likely to make the most *courageous* of us *think twice*.

A new, and not fully tested quantity, unlike the tried and tested longevity of the London Underground, the Channel Tunnel market place will require much information reassurance, possibly something to take the mind off the uncertainty. Therefore an interactive information system conveying information about the tunnel would allow passengers to view what they wish, when they wish, and at what speed they wish to.

2.1 Aims

To assist passengers using the channel tunnel rail link using interactive information aids.

To convey information that cannot be achieved successfully by only printed media.

2.2 Objectives

To find and study the existing passenger information systems planned for the Channel Tunnel link. The intention to find where the opportunities and limitations are.

To communicate the scope of information design provided for on Channel Tunnel passenger services and indications for development using interactive media.

To look at the range of existing media forms available at present for passenger information use.

To gain a more indepth understanding by consulting experts through my contacts involved in the passenger information design applications for the Channel Tunnel.

2.2 Objectives (*continued*)

To reduce the degree of anxiety experienced in the use of information by travellers by providing a suitable means of information communication.

To isolate an information design problem for the channel tunnel link.

2.3 Personal Objectives

To find the advantages and disadvantages of such a system and consequently how much interactive information is really necessary

To try to understand the practical production of ideas through video and Multimedia generation.

Research Methods

3.1 Literature Research

In order to organise the information for such an open and possibly complex design research project it was necessary to view and allocate information into certain areas.

- **The Channel Tunnel**
- **Multimedia and Interactive Multimedia**
- **Information Anxiety and Sign Design**
- **Areas of Information Design and Graphic Design**

Once the outline for the project was agreed the initial step was to undertake a complete search of De Montfort University's Kimberlin Library, University of Luton's library and Ravensbourne College's Library, each where I had easy access. A **scan search** of each revealed a number of relevant sources.

Since the subjects of the Channel Tunnel and Multimedia are in their infancy it was necessary to find as much recent information possible in certain **indexes** and then work backwards from there. A number of indexes were of use. *See Appendix 1.*

Literature Findings

On the run up to the opening of the **Channel Tunnel** on the 6th May much journal literature became available on the development, the financial and company arguments. However the most exposed areas appeared to be;

- the questions of safety and why Eurotunnel has persistently refused to make the public aware of vital safety information.
- the potential effects of bringing us closer to the continent.
- MINTEL papers have revealed a number of points of market research that have been explored in relation to the Channel Tunnel. A visual form of the information may be found in *Appendix 11*
- the facts about the Eurostar and Le Shuttle.
- how the night train will be able to transport people from Scotland, Wales and the West Country to a number of continental city centres.
- a number of videos found in the Kimberlin Library on aspects of the tunnel safety and how to deal with the emergencies. These videos portrayed sheer scale at which the tunnel technology can combat the threat of fire and smoke.
- how to get people used to travelling through tunnels initially before attempting the Channel Tunnel.

- the inability of British Rail planning to provide a high speed line as the French have done but to simply upgrade the worn out over used Network South-East commuter lines.

Multimedia and Interactive Multimedia Findings

Multimedia and Interactive Multimedia findings were initially few and far between, but with a further intensive search into specialist magazines and newspaper articles the subject revealed itself to be full of possible avenues for design concepts.

- From a number of articles there was a question of multimedia maturity and the certain applications for multimedia at present, most notably education, and the potential uses. Many questioned these uses.
- How the combining of information and telecommunications will bring about a digital information highway.
- A popular point which came across in a number of articles is how Multimedia is 'an end to a means', that is, we have the technology, what are we going to use it for?
- A number of videos on multimedia and computer graphic applications were found. Especially useful was *Hyperland* by Douglas Adams (1990).
- The only published work found to be of significant use so far is *Macintosh Multimedia* by Michael Murie (1993) which gives a guide of how to devise a multimedia project and what steps are required. See *Appendix 5*.

Information and Graphic Design Findings

Due to my background in **information and graphic design** I have a reasonable knowledge of what would possibly consist in an information system and how it may be applied, but to enhance this for an interactive application I felt it necessary to read more indepth about information design and design standards, and engage in a case study on **information anxiety** in travel and **sign design** (*Appendix 4*). On completion of the case study more relevant information which emphasized and expanded some of the case study points were found. These points were made by a Mr Neil Anderson of London Underground and can be viewed in *Appendix 10*.

Information Anxiety by Richard Saul Wurman (1991) has proved invaluable as a source of knowledge and inspiration in understanding about information in all its forms, the problems encountered when using it and the possible improvements or solutions for information anxiety.

The Information Design Journals by the Information Design Association showed and explained recent developments and applications of information systems for public areas through seminar notes and interviews.

The **CD ROM** information system in the Kimberlin library was very useful for finding the most recent and focused articles and cuttings about specialist points to do with both the *Channel Tunnel* and *Multimedia*.

3.2 Primary Research

In order to gain further required information about specialist issues regarding the Channel Tunnel, Multimedia and Information Graphics a number of contacts involved in these areas have been contacted by telephone, letter or fax or by attending seminars.

The following people have been particularly helpful in providing immediate and up to date information about certain subject areas related to the project objectives as well as interesting ideas and comments from their points of view Further detailed documentation can be found in *Appendix 3*.

Channel Tunnel

European Night Services

Mark Willcox- Design Manager of the Channel Tunnel Night Train.

Nicholas Grimshaw and Partners

George Stowell- one of the architects involved in the design of Waterloo International Terminal.

Eurotunnel Exhibition in Folkestone (Fig 12)

Claire Whiddon- one of the design coordinators of Eurotunnel's Cheriton Terminal.

Paul Johnson- New Works Division (Coquelles, France)

Sue Reay- Information Officer (Folkestone)

Multimedia

BAA Gatwick Airport Interactive Passenger Information (Fig 13)

Stephen Graham- Systems Development Manager, BAA.

Littlewoods Interactive Shop Assistant (L.I.S.A)

Roger Hoe- Head Office in Liverpool.

Galleria 21 (Heathrow) interactive shopping See Appendix 9

Mr Mike Adams- Galleria 21 coordinator.

British Airways Interactive (Heathrow Airport)

Mark Fielder- one of the coordinators of the British Airways Interactive System.

Argos Interactive Shopping System (Fig 14)

David Crawford- Marketing Manager.

Leicester Bus Station (Busline) Interactive Information (Fig 15)

Photographic survey

CRL Thorn EMI Central Research Laboratories

Terry Dean- Sales and Marketing Manager

Clive Van Heerden- Interaction Designer

AT&T Telecommunications (NCR computers and Terminals)

Matt Studholm- Galleria 21 promoter

Hertfordshire Library touch screen book finding system (Fig 16)

Photographic Survey

4D Seminar, De Montfort University

New opportunities for multi-disciplinary research

in association with the Design Research Society

Information and Sign Design

- Waterloo International Visit 25/3/94
- Underground and BAA case study (*Discussion Paper, see Appendix 4*)
- Chris Ludlow Seminar- Signs, What Signs? 15/3/94

Computers

Apple Macintosh packages and PC packages for graphics typography and report processing.

Apple Macintosh and PC Multimedia packages for information screen design, animations and video simulation, and other possible pictorial or photographic applications.

Video

Possible use of video equipment to obtain real time action movement recordings from train carriages and cabins and allow a better understanding of the train configuration- (computer facilities would allow simplification into framework and editing into different viewing angles, oblique views and eye level views).

Photography

.....

Black and White and colour photography and slides facilities for presentations and design material of the stationary visual information to be used in the interactive system.

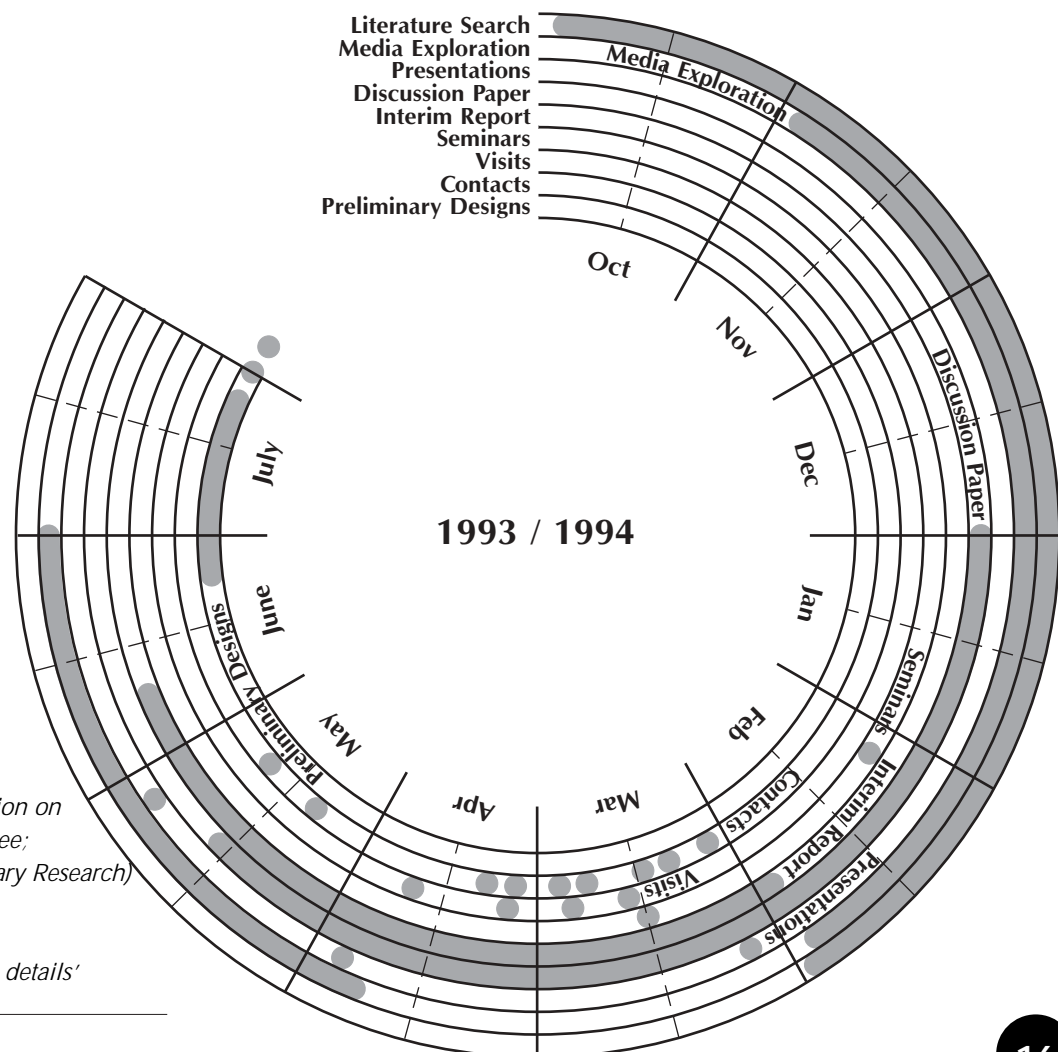
Project Management

Following the intensive literature search to see if there was a viable project aim for an interactive information system for the Channel Tunnel, Mr Mark Willcox, Design Manager of the European Night Service (ENS) train, was contacted by telephone. He expressed an interest in following the project through, rather as an interested party than a client.

The next step was to become aware of the Channel Tunnel, its running procedures, who was building it, going to use it, and reasons why? Relevant applications of information and sign design which had been implemented already. To find out if an interactive system or design had been considered in order I did not interfere with anyone already engaged in a similar project. The above research was achieved to find where the problems and opportunities would exist.

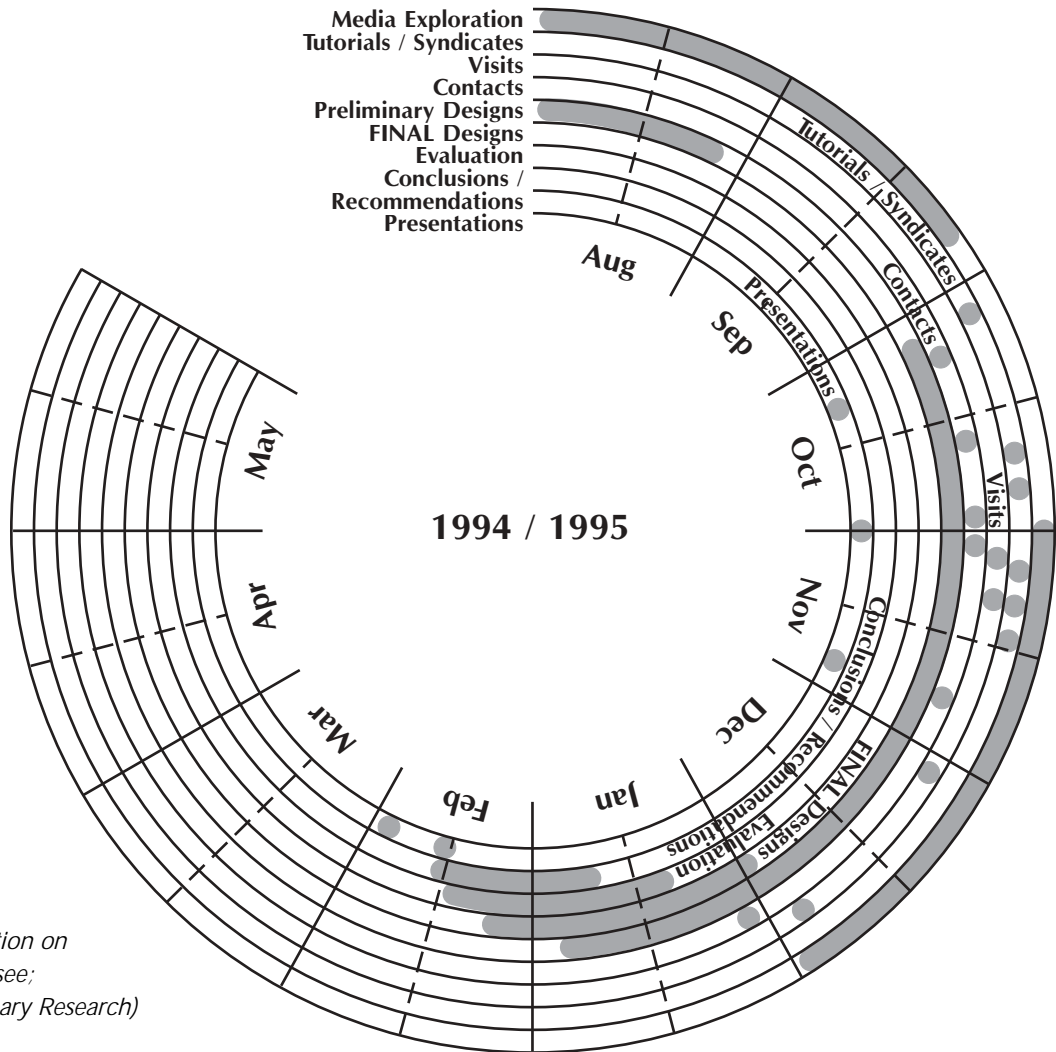
The learning of Multimedia and Interactive information was necessary since it is a recently discovered subject area, constantly moving and updating. The need to learn background information and gain experience, viewing and using existing systems and recently introduced systems. It was therefore, vital to have hands on experience to gain more design expertise in this field.

4.1 Time planning 1993 to 1994



For further information on contacts and visits see; **Section 3** (3.2 Primary Research) and **Appendix 3** 'Contact names and details'

4.2 Time planning 1994 to 1995



For further information on contacts and visits see; **Section 3** (3.2 Primary Research) and **Appendix 3** 'Contact names and details'

Research Findings

- The initial stages of this project have looked into the history and the development of the Channel Tunnel, the problems of information and sign design in other contexts and how the ideas can be applied to play a part in reducing anxiety in the Channel Tunnel. Many videos in the Kimberlin Library and Ravensbourne College library proved to be helpful.
- For the intended idea of an interactive information system for the tunnel background research into multimedia, hypertext and other interactive information systems was necessary in order to find how ideas arose, and how designs were implemented and then produced.

5.1 The Channel Tunnel

- The history- the facts, figures and dates
- The environmental effect
- The rail traffic flow
- The on-going improvements
- Special disabled requirements
- The safety procedures
- The economic opportunities for the UK and Europe
- The scale of the project- the people, the work, the timescale
- The Eurotunnel exhibition- atmosphere of travel, lifesize replicas.
- The marketing
- The predictions- new lines and terminals

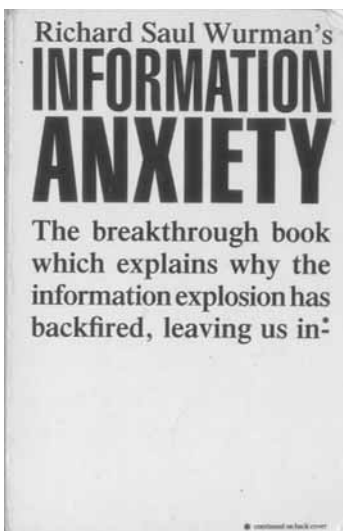


Fig 14
Information Anxiety Cover

5.2 Information Anxiety

As explained in previous sections, safety and passenger anxiety will be key issues when passing through the Channel Tunnel. Not all the anxiety can be relieved, but through a study of Richard Saul Wurman's book *Information Anxiety (Fig 17)* it became clearer where possible problems could arise, and how they may be applied to an information system. A case study was undertaken on *Information Anxiety and Travel* taking BAA airports and the London Underground as examples in order to see where potential improvements could be investigated for the Channel Tunnel, *see Appendix 4*. The examples were chosen for the information given when travelling internationally (BAA airports) and when travelling in an underground situation (London Underground).

5.3 Human Memory

- There are two main parts of human memory;
- Short Term Memory
 - Long Term Memory

Little is known about the human brain management system, but from

experiments it is understood that the short term memory capacity is limited. According to psychological research the short term memory is unable to hold more than approximately 7 items. (Shneiderman 1987)

Memory is internal knowledge and people use their memories to retrieve information via a number of categories;

- Memory for **arbitrary** things, that is, isolated items with no apparent meaning and no particular relationship to one another, or to things already known.
- Memory for meaningful **relationships** are items of information retained to create and form bonds between information already known.
- Memory through **explanation** is information that does not have to be remembered, but derived from other sources such as books or lists.

Short Term memory or *working memory* is a flexible store in which information is temporarily held. It retains the memory of the present and the very recent past.

Long Term memory is a more permanent store, where information of the distant past is stored. Deeper knowledge is stored here and is maintained over long periods of time. It is the type of memory which is much harder to get information into, and harder to forget things from.

5.4 Interactive Design and Multimedia

Creating an interactive multimedia project
How the interactive systems are designed
How they work
How much work is involved
Who designs and produces them

The avenues for applications- A useful article on a programme for interactive language learning, in this case Spanish, is a possible potential avenue for interactive material for part of the project. It shows how multimedia can now produce various types of programmes with relative ease. See *Appendix 8* (Williams 1994).

5.5 Passenger requirements

Information needs

The boarding and disembarkation procedures of Le Shuttle and the Eurostar trains, where applicable.

Directions required on the interactive system at human decision making points and navigation possibly through map, plan or simulation with the *you are here* information.

Information about the train on-board facilities and terminal facilities for the Eurostar and Le Shuttle trains where applicable.

Descriptions and explanations for the emergency and evacuation procedures from the tunnels, how to leave the train and showing the directional flow of passengers.

Note: *all the information above should be designed for the four main European languages, English, French German and Flemish with potential to update and add extra languages if required.*

Information anxiety

To prepare people for problems which may arise other than safety and emergency, using verbal and visual material applied to an interactive system.

5.6 Information types

Information already provided on printed media, may or may not work effectively on interactive systems. This obviously depends on the situation, the time of day and the individual who uses the information. From the study in *Appendix 4* it reveals that the existing information provided in airports and on the underground on *printed* and *visual* media is;

- directional information
- warning information
- location information
- safety information
- emergency information

...and that verbal information is provided either;

- over an intercom
- person to person (conversation)

The possibilities to extend this to *interactive multimedia* information has to be explored further through preliminary design. *Appendix 7* reveals a number of other items deemed to be considered potentially useful for an interactive information system.

5.7 Channel Tunnel Safety features and Emergency Procedures

5.7.1 Safety

Train Breakdown

Few breakdowns are expected and most are likely to cause delay rather than danger. The following procedures both relate to shuttle and passenger through trains. Breakdowns involving the failure of a power car can be dealt with by;

- pushing the affected train with another train
- separating the unaffected parts of the train and removing them with the power car at the other end

In the case of failure of both English and French national grids there will be diesel power cars on standby to deal with train retrieval (**Fig 18**).

Water Draining

There are a number of pumping stations in the undersea parts of the tunnels. They have the capacity to deal with;

- water seepage
- damaged water mains
- rain running off the trains
- tunnel cleaning
- fire fighting practices and the real thing, if necessary

Ventilation and Cooling

The central service tunnel circulates air to the two rail tunnels through the cross passages (**Fig 19**)

An extra ventilation system has been installed for emergency use and is designed to be used with the other ventilation systems.

The ventilation systems are controlled centrally making them easier and more efficient to control smoke presence in the tunnel, if necessary.

The heat generated by trains could cause the air in the tunnels to become too warm therefore a cooling system will circulate chilled water through steel pipes in the two rail tunnels from each coast (**Fig 20**).

Collision Prevention

The two main running tunnels operate in different directions reducing the risk of head on collisions.

The signalling system has Automatic Train Protection and is designed to minimise the risk of any type of collision, even during the use of only one of the lines when maintenance is being carried out.

Automatic signalling is transmitted through the tunnel system to the driver. If the driver does not react to the information the train will slow down or stop.

The time is divided into track-circuited sections to make sure all trains are separated by more than their braking distances.

Rabies

Ensuring that the risk of rabies entering Britain is not increased because of the existence of the tunnel has been reduced by the following applications;

- the use of ultrasound in the tunnel
- electrified barriers at each end of the tunnel
- security fences around the terminals

The tunnel operating procedures have been designed to prevent animals making their own way through the tunnel.

The tunnel is over 30 miles long. That is long distance for any animal in such hostile environmental conditions.

Note:

In addition there has been a campaign through France to eliminate rabies by dropping vaccines in food.

Dangerous Goods

The company who own the tunnel system, Eurotunnel, will not permit the transport of certain types of dangerous goods through the tunnel;

- gas tankers
- cargoes of liquid petroleum gas
- petroleum tankers and cargoes of highly volatile or inflammable products
- nuclear waste
- dangerous or highly corrosive chemicals

They will continue to be shipped by other means.

Communications

Each of the Le Shuttle trains will carry a crew of eight staff;

- a driver
- a train captain
- a crew member also qualified to drive the shuttle
- one trained staff member on patrol for every four wagons on each shuttle

On boarding the train passengers are given clear instructions on emergency procedures.

Communications will be available by radio links between;

- the control centre, the driver and the train captain
- the driver, the train captain and the patrolling crew

See Fig 21

An alarm system will be used in emergencies. This permits communication between passengers and the shuttle crew.

Closed circuit cameras will monitor;

- the shuttle wagon interiors
- the shuttle loading and unloading areas at Folkestone and Calais
- areas through the tunnel

Special procedures will be attended to when identifying vehicles carrying disabled people. They will be located in arranged positions on board Le Shuttle.

Service Vehicles

Special service vehicles are used for maintenance and emergency purposes including fire and ambulance and should reach the scene of an incident with a minimum of delay (**Fig 22**).

5.7.2 Emergency Procedures

Evacuation procedures

A fire in a stationary vehicle in a shuttle during the tunnel journey is considered to be ten times less likely than a fire on the same vehicle travelling along the road.

However it is necessary that people in the shuttles or on the Eurostar are evacuated in the shortest amount of time with the minimum fuss in the event of *the smallest fire*. Depending on the extent of an incident the following procedures may apply;

- evacuating the affected carriage(s)
- uncoupling the affected area of the train
- evacuating to another train in the opposite tunnel
- evacuating to vehicles in the central service tunnel

See Fig 23

In the event of a serious incident on board Le Shuttle the last resort would be a Halon Gas fire suppression system after the passengers have been evacuated to an adjacent wagon.

Note:

Eurotunnel is required to have procedures to ensure that if a train is stopped or disabled in the tunnel for any reason;

- *any other trains can be brought out without delay*
- *all passengers can reach the open air within 90 minutes*

5.8 Eurotunnel Fire Safety Policy

The aims of Eurotunnel's fire safety policy will be:

- to minimise the likelihood of a fire occurring by appropriate design and selection of materials
- to ensure early discovery of fire
- to contain a fire within one wagon with fire doors and suppress it with fire extinguishing equipment
- to implement a range of emergency responses which will minimise the impact of fires

The above aims will be achieved by various measures designed into the system of which there is a summary below;

- *wagon drainage systems to minimise the risk of fuel leaks collecting*
- *fire detection systems*
- *three means of fire suppression in the shuttle wagons*
- *hand held fire extinguishers*
- *automatic foam system for dealing with fires underneath vehicles, particularly those caused by leaking fuel*
- *an automatic or manual halon gas system to be used if the fire survives the first two measures*
- *a fire main system in the service tunnel fed from both sides of the Channel to ensure an uninterrupted supply. Fire hydrants will be located in cross passages as well as in the running tunnels*
- *fire-fighting personnel with specially designed vehicles for fire fighting and other emergency purposes to gain access through the service tunnel*
- *automatic fire detectors and suppression systems in the underground technical rooms located along the length of the tunnel system*

Safety procedures which will be in operation include;

- clear safety instructions to passengers and staff and encouragement of their vigilance
- preparation and practice of emergency procedures

In the event of the emergency the procedures will be;

- *moving passengers along the shuttle or train from the affected wagon or carriage, closing the doors behind to contain the fire allowing the shuttle or train to continue to its destination wherever possible*
- *mobilising Eurotunnel and local authority emergency*
- *uncoupling and abandoning the affected portion of the shuttle, removing the other part(s) of the shuttle and all other trains and shuttles in either direction by both rail tunnels while strictly controlling the tunnel ventilation*
- *evacuation of passengers through the fire doors to the service tunnel from any section of an immobilised shuttle or train, then either into the opposite rail tunnel for transport out by another train or, in exceptional cases onto emergency service vehicles to be driven out through the service tunnel*

5.8 Train Configuration

The train configuration information is very useful on an interactive multimedia system. It allows the passenger to be aware of their location and orientation on board the train, and this is important since all the Channel Tunnel trains are so long. It also may act as a map allowing an easy navigation to required facilities on the trains.

Le Shuttle

A standard train will run with **12 single-deck passenger-vehicle wagons** (known as a *rake*) carrying the taller vehicles, namely vans and caravans. Also **12 double-deck passenger-vehicle wagons** (also known as a *rake*) for standard car sizes. (*Fig 24*)

At certain times, however, passenger vehicle shuttles will operate with a single set of 12 single-deck or 12 double-deck carriages depending on the time of day and demand.

Eurostar

The Eurostar passenger train running between London and the continent will have a standard train configuration of **10 standard, or second class** seated coaches with a capacity for 584 passengers. **6 first class** seated coaches with a capacity for 210 passengers and two bars in the middle serving first and second class. (*Fig 24*)

Night Train

European Night Services 'Night Train' with extended services across the continent will have varying configurations according to demand but initially will generally be one of two;

- **3 seated coaches** with a capacity for 150 passengers and **3 cabin coaches** with a capacity for 60 passengers. A service vehicle will divide the seated and cabin coaches.

OR

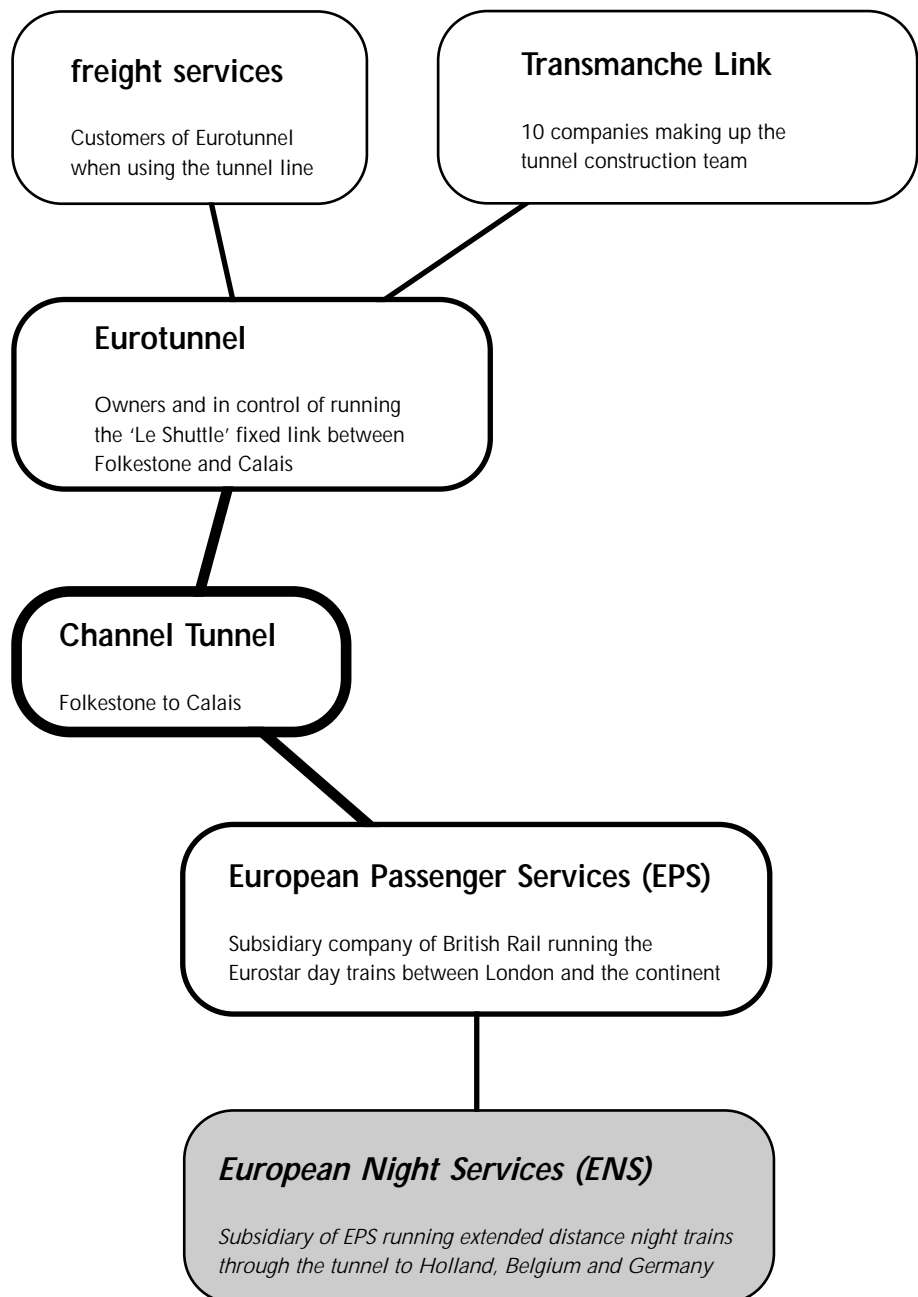
- **2 seated coaches** with a capacity for 100 passengers and **5 cabin coaches** with a capacity for 100 passengers with the service vehicle again dividing the seated and cabin coaches.



Interested Parties

Although the project was self initiated it was necessary to find out how interested and how viable such a concept was to an outside initiative.

Mr **Mark Willcox**, design manager of the European Night Services (ENS) Night Train was approached. Speaking to him on the telephone he expressed an initial interest to follow on from Colette Miller's MA (Miller 1993) leaflet design project for the night train. He could not guarantee being a client for the project, but showed an aspiration for being an 'interested party' and would speak to his product design department to look at the possibilities.



Late into the project, a copy of the interim report and a letter was sent to Mr Derek Meredith, Eurotunnel terminal manager of Folkestone on the 19th October 1994. In reply I received a letter from **Mr Paul Johnson** in the Works Division of Eurotunnel in Coquelles enquiring if I was interested in being involved in the design strategy of the information screens at Folkestone and Calais and if it was relevant to the project. Further information on developments may be found in Appendix 3.

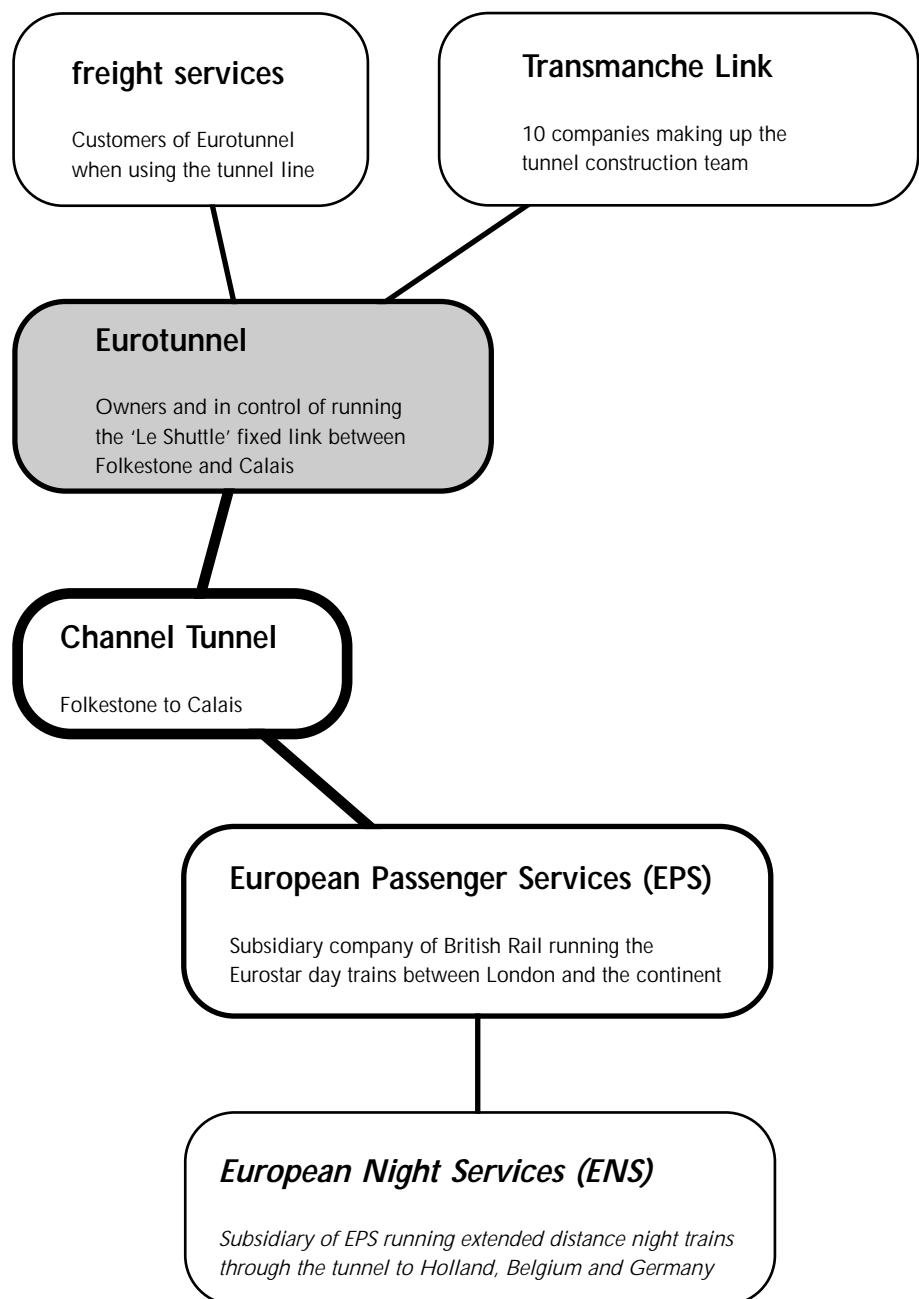
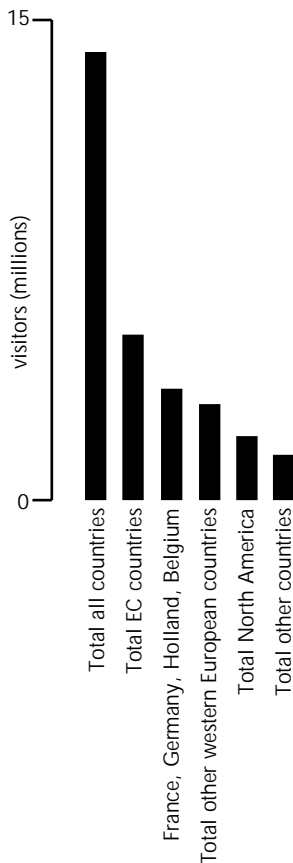


Fig 15
Visitors to Britain by country of origin



Audience

The designing of an interactive multimedia system to complement the information design for the Channel Tunnel trains and terminals, will have to be researched carefully in order to consider who the information would be aimed at. This would include traffic which would be drawn away from the ferries and short haul European aircraft shuttle flights. There is also an opportunity for marketing grey areas for potentially new passengers.

A number of questions had to be asked about the variation in people who will use the Channel Tunnel and therefore the people who would use an interactive machine. The initial questions that come up are the nationality and cultural differences, reasons for the journey, and age differences.

From Colette's findings (Miller 1993) almost one third of visitors to the UK in 1985 were from France, Belgium, Germany and The Netherlands. Of the 46 million UK residents that travelled abroad in 1987 75% went to the Western European countries on the continent. These findings would make both many British and continentals potential Channel Tunnel users.

Additional information about opinions of the Channel Tunnel may be found in *Appendix 11* (MINTEL marketing report)

7.1 Initial considerations

Nationality

Due to nationality and cultural differences, English and French languages will be used on the Le Shuttle trains, with some extra information being in Flemish and German.

Initially the main languages of English and French will be used for the Eurostar service with supplement pieces of information shown in Flemish and German.

The night train will cover a number of countries and therefore the service will contain a number of languages. Due to the financial interest and involvement of Britain (England, Wales and Scotland), France, Germany, The Netherlands and Belgium in the running of the night train the languages to be used are *English, French, German and Flemish*.

The nationalities of passengers using the Channel Tunnel will vary depending on the place of departure and destination and the reason for the journey. The figures for certain travelling nationalities are only predicted at the present time.

Age

The ages of people using Le Shuttle, Eurostar and the night train, and therefore responsibilities will vary when using an interactive system. Be it on any of the trains there will be enough variation in age to warrant a very carefully thought out interactive system design. The possible abuse from school parties on trips. Senior citizens or maybe disabled people who have difficulty using their limbs or have failing eyesight may find it physically difficult using or reading information off such a system.

These areas open up opportunities for a number of variations of an interactive multimedia system, rather than maybe just a single design. Perhaps deliberately designing one to make it more sophisticated and sober looking to make it unattractive for children.



Fig 16
Logo used to display facilities for the disabled

Level of literacy

Educational background has to be considered because more people now have the ability to travel. Therefore the ability also to read and comprehend information in a context should also be considered. However, In general, the level of literacy is high in Europe, but for ease of understanding and clarity the use of icons or symbols and pictograms and illustrations would help overcome cultural and reading difficulties thus reducing information anxiety.

Abilities / Disabilities

Provisions at Waterloo International station in London have been considered in the design very carefully, that is, installation of elevators and travellers as well as floor textures on the platform for the blind and hard of seeing. Special seats have been designed for the Eurostar train. The night train also has cabins catering for disabled needs. The information requirements for on-board or in terminal areas maybe desired by a disabled passenger. This information may be possible to convey through interactive means.

Reason(s) for the journey

One of the most important marketing areas for the Channel Tunnel companies and one which would sway the interactive multimedia content. From the initial research undertaken here are a number of main reasons why people would journey abroad, be it from England to the European continent or vice versa.

- the *business market* for the night train;
the overnight hotel costs would not exist by using the night train.

- the *business market* for the Eurostar train; city centre to city centre in less time than an aircraft and no time wasted by arriving at an airport, finding a place to park then boarding the plane etc...
- the *business market* competing with the ferries; Le Shuttle providing a faster, more regular and more convenient service.
- the *tourist industry*; be it travelling on holiday, a short break, touring or inter-railing. The Eurostar, night train, and Le Shuttle will make all this possible.

Other possible reasons for travel;

- intercity *visits or shopping* to London, Paris or Brussels.
- quick trips to the French supermarkets in and around Calais.
- visiting *friends and relatives*.
- *moving house*- the extra room on the train allowing for more baggage space and faster travel time.

7.2 Special considerations

From the research results so far a number of possible reasons have arisen for using such a system.

Audience interest in the material

Do people really want to know more about the trains, the tunnel, the terminals, their facilities and safety information? The points which may be raised and questions which may be asked;

- to engage a passenger's curiosity
- to find how things work
- what happens if things do not work
- passenger calming by revealing individually useful information

Reason for using the material- motives

- It can seem like a long journey, on-board facilities would provide valuable and interesting information reducing the boredom factor.
- reading is popular on-board trains at present, and this would be supplemented by useful interactive information system or systems.
- new idea, something new is always popular. If the design is produced well, first impressions will last.

- information regarding facilities and safety.

Any other barriers to learning and understanding apart from the aforementioned points;

- familiarity of equipment, structure and design
- the understanding of the media, more importantly the understanding of interactive multimedia
- location of screen or screens
- cultural differences
- language differences
- individual physical/mental disabilities
- space- -physical space for the system
 -computer memory and working space
- practicality of such an interactive system

7.3 Audience Sophistication

Every person has a different awareness, understanding and a differing view on the subject of computers. People also have different perceptions and attitudes of how they work and how to use them. A public information system is open to scrutiny from people of all walks of life and educational backgrounds. These different groups of people may be categorised very generally with computer experience terms (Johnson 1992). They are;

- *Parrot*– These have the least experience when approaching a system and can only handle a small amount of information or instruction. The single character, key or button. They do not think, question or understand the idea of being given directions. Therefore the best form of assistance is an *example* or a *singular choice menu*.
- *Novice*– This is a parrot who understands isolated concepts and begin to attach meaning to the order of instruction, but the language content needs to remain standard, not abstract.
- *Intermediate*– These are novices with further experience. They require guidance in the use of new concepts and services and rely increasingly on reference information. This aids recall of information that has previously been learned and allows the building of relationships between previous and present information.
- *Expert*– The next evolution from immediates. This level comes with experience, the continuing ability to learn, the opportunities taken and in some cases a drive or enthusiasm to understand. These people require reference or instructional information to remind them selves about areas they use or experience infrequently.

Design Strategy

8.1 Design Process

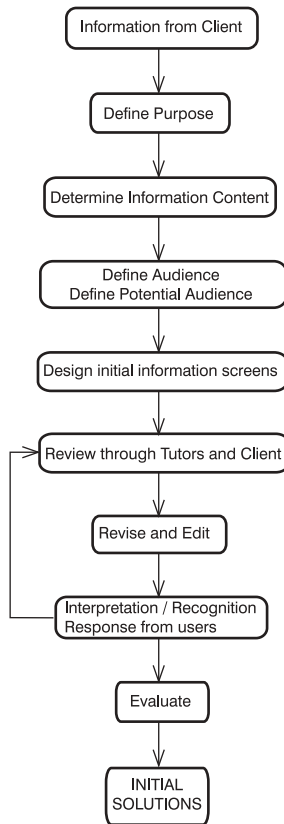


Fig 27
Design Process

The design process is paramount to the organisation of the control of ideas and their application. Much of the preceding report areas have followed a design process. A simple process for this project may be seen in Fig 27. There are many considerations when designing information for the public. It must look attractive and make people **want** to use it, be readily understandable, legible and be designed in a familiar or understandable media in order for the audience to easily receive the information provided for them.

8.2 Design requirements

An information system user only wants to know what he or she needs to know, to use and understand an information system. Any extra information which is provided but not required will only cause confusion and distraction from the aim of the information system, that is, to convey clear concise information and allow the user to understand and learn. A visual and information clarity should be attained. A complex over fussy visual display can appear cluttered and poorly designed, such as some of the earlier CD Rom interactive learning packages.

Poor design may prolong visual search time and may lead to misinterpretation and errors. There are also the less obvious effects such as *visual fatigue*, *frustration* and the *wavering and reduction of interest* in the facility. The user may feel that the display or the information content and style is too complex to understand, or that to understand it would require further time which the user would not be willing to commit for various reasons.

A designer would continually question the design characteristics of the information system;

- Is the viewer receiving the required information from the system easily, or is he busy trying to understand how the interface or program works.

The designer should therefore have a researched knowledge of the information areas and content and how they are to be implemented and accessed by the viewer. These areas of research should be fundamental before any constraints of screen size, response time or font or colour availability is introduced. An effective set of screen designs in defined sequences providing the necessary information data is required to make the system work effectively.

8.1.1 Information representation

The application and design of information is vitally important to make an interactive system useable. If the design is bad, that is, too complex, difficult

to understand and unfamiliar and unattractive in format, people will not want to use it.

The use of icons, main words or familiar phrases may break down some of these language and cultural barriers. However, for such a system design, solutions for language menu navigation would reduce the need to repeat certain pieces of information in different languages, verbally and visually.

The *legibility* of the information is dependable on a number of internal and external factors. The *lighting* and *colouration* of text, pictures and base colours are important in the design of hyperscreens in order to create an identity and theme, but also taking into account the external lighting which may affect the resulting colours.

Consistency is fundamental to computer information systems. This is especially so through forms of interactivity. The designer should clarify a set of guidelines to preserve consistent ...

- location
- structure
- terminology

... across all screens. Consistency aids predictability, whereby the user becomes more comfortable when using the system as he or she will always know where to find specific information on the screen by format recognition.

Sequences of screens should be similar throughout an information system. The user should be offered some sense of how far they have to go before they reach an ending or a decision point. It should be possible to reverse the direction of that sequence to remind or refer to the previous areas of information before moving on.

If a burden of *large amounts of information* are placed in the human memory at any one time this can create stress, fatigue and boredom in a user. The intake of information becomes less efficient, therefore learning and response becomes slower. A design requirement is, therefore, to recognise the problems and potential areas of *brain load*. The less the brain is required to be involved in understanding the information system itself, then the more important information may be more easily received and formulated.

Some scientific research suggests that the brain and eye automatically search for a *visual order* and a *hieracy* (Shneiderman 1987). If the following items prevent this, namely;

- conflicting colours
- cluttered or over fussy layout
- poor text application
- poor foreground and background relationships

- poor use of colour coding
- poor use of shape of icon coding

... this can result in visual fatigue, confusion or boredom. The performance in an information system may be reduced, due to user stress, reduced concentration and some irritation it becomes difficult and laborious to use in any way. The design requirements here are to resolve as many of the problems that create these negative effects on the user.

Colour is an extremely powerful tool in information design. It may solve a number of problems in conveying hierarchy, classification of items, form a structure and a visual order. The use of too many bright primary colours in an interface may be destructive even if the design is good.

- Bright colours make the pupil contract, this can make the eyes tire when going from bright to dull colours.
- Bright colours attract attention and may be distracting, if used incorrectly. The strong contrasts of red and yellow, red and green, red and blue create distracting visual vibrations and shadow illusions. This may be enhanced if the viewer is tired.

The major contrasts in colour should be reserved for typography, especially small screen text styled typography. Light text on dark backgrounds and dark text on light backgrounds. For example white text can be given a deep blue background and therefore induce faster reading times.

The existing forms of text on some computer programs do not appear as clear and consistent as that on paper due to a number of factors;

- The ascenders and descenders of letters are compressed, altering the shape of letters and words. This, therefore, does not follow and denies the user a consistent expectation of word and sentence shape.
- Due to excessive information to be projected the leading at times has been as minimal as possible, possibly solid in some cases. Again a sensible leading size will reduce the glare intensity and the blurring of images and text.

The best background colours are those which are hard for the eye to focus on. Therefore, these types of colours should not be used to represent small or detailed information areas due to potential visual stress. The human eye may be able to focus at different distance intervals but pure colours on a singular surface appear to be at different distances from each other. This is similar to the concept of how different coloured light bends at different angles through a prism from a given white light source. For the majority of people;

- *Reds* appear closer.
- *Blues* appear more distant.
- *Blues, greys* and *white* are colours which signify neutrality and are therefore ideal background colours.

Too many colours on a screen can be confusing. In general a maximum of seven colours should only be used at once. Three, four, or five with related tints or tones are more favourable. The human mind experiences much difficulty in maintaining more than five to seven different elements in short term memory simultaneously. The use of many colours would just simply lead to confusing the user's information intake and thereby reduce learning.

Since a certain amount of information supplied to the viewer may only be remembered for a short amount of time, the idea of making that visual information clear, simple and memorable is paramount. This may be achieved in a number of ways;

- cues for recognition- the use of *menus*, rather than trying to remember commands puts less demand on the memory of the user. The viewer, therefore, only has to read what is there on a menu, this should be explanatory enough. This would be made even easier if icon representation were used. This menu recognition requires far less brain load than having to remember the correct response to a specific command.
- by not using *abbreviations*. Abbreviations are stressful, even if the individual knows what they are. They slow down reading time and increase thinking time, thereby creating fatigue. They are not a natural language form and therefore require more strain on the short term memory.
- providing an idea of clear *navigation* (as indicated by the flowchart in the Section 10 sketches area). When one style of screen display style is replaced by another style, stress is created. Questions then form like;
 - How do I get back to the previous screen?
 - Can I go back and make a different decision?

The *typeface* is a major factor in any information system. It should be appropriate and reflect and compliment the information content being displayed. For something like the Channel Tunnel, the typeface should reflect style in a modern way to complement the new trains and terminals, be clear, timeless and sophisticated. A difficult task, but with the opportunity to experiment since no similar project has been commercially attempted as yet. Different typefaces have different legibility values for different people in different situations. However, in today's society Helvetica and Univers and

other related and adapted sans-serif faces are standard for easy to read signage, and serif faces, such as Times are produced in newspapers and books when using much text.

Computers have taken over typography, making it fast and easy to choose certain sample typefaces to be applied into drawing and desktop publishing packages. But with this choice should come design responsibility.

The size and style of typography also depends on the information to be displayed and the physical distance at which the text will be viewed from. There are other factors affecting the more technical side of setting the type, including;

- tracking- the spacing between each letter.
- leading- the spacing between each line of text.
- justification- the physical arrangement of text blocks on a page.

The actual grammar and linguistics also have to be thought through. The structuring of sentences and wording in sentences to bring across the most concise, direct and understandable message in each language.

The design of *buttons* should be aesthetically attractive yet be designed to represent its singular function. Icons on or at the side of buttons removes the need for providing text with certain buttons. Buttons which navigate backward through an information system should be placed further to the left, with progressive buttons located to the right. However buttons which are related to each other should be placed close together.

8.1.2 Object Representation

The physical housing of an interactive system has to combine and complement the surrounding environment. The size and style of design should be attractive and respond positively in the user environment. The machine should be seen easily where required and be accessible. Yet at the same time it should not block the flow of other passengers.

8.1.3 Information Content

This is the actual information that is to exist in the system. There are a number of ideas listed below gained from the literature and the primary research and relevant enough to be considered. However such an interactive system will only have a limited memory capacity. Careful consideration must be given to what should be included and excluded with a view to updating as and when required.

The shorter and more concise the information the better the system would be. Using short phrases or single words with icons to complement and clarify the information where possible would be ideal.

...information content; (appropriate for the Eurostar, Night Train or Le Shuttle depending on the location of the system)

- Train Information
 - Safety information*
 - Facilities- In Cabin for Night Train -Others*
 - Train Layout and navigation (map format 3D or Plan)*
 - Train timetable network*

- Help or Assistance
 - Information Desk/area*
 - Train Manager/Guard*
 - Using a Telephone*

- Terminal Information
 - Information Desk*
 - Meeting points*
 - facilities*
 - navigation*

- Disabled persons facilities
 - On train*
 - In terminals*

- Tourist Information
 - See Tourist Information possibilities in Appendix 7*

Language Phrases and useful sentences. See Appendix 8 for an example of interactive language learning

- Duty Free Shopping, similar to that implemented by Galleria 21.
See Appendix 9
- An easy search SUBJECT INDEX may also be necessary such as on TV teletext
- An optional printing facility
...in which to obtain an on screen printout be it black and white or colour

8.1.4 Unit Robustness

If such a system is installed on a train the unit will move about with the train movement and coupled with passenger use the system will come under much wear and tear.

- If for some reason the unit breaks down back up power should be made available
- If the system breaks down there should be a facility for easy maintenance
- Through both construction and design an easy updating system should be considered, that is, *designing for flexibility*.

8.3 Media Selection

Interactive systems are providing great potential for *learning* and *teaching*. multimedia allows collection of information in a variety of media to be stored in a computer format and allowing immediate access. Therefore, comprehensive and diverse information subjects may be assembled and designed to be used by a required audience.

Interactive information is an opening to a *choice* environment for an individual rather than just simply a passive information environment. There is a choice to follow trails of explicit links or a possible avenue to create an individual trail according to ability and objectives.

Multimedia offers new ways of *learning how to learn*. An opportunity to diverge from the linear path; to join text, animation and sound; to turn the technology into an aid, allowing review and learning of the content at an individual's own pace. This kind of 'fluid' environment requires constant 'decision gates', perhaps heightening participation and maybe creating a higher order of thinking skills.

The use of interactivity via computer interface may also be useful as teaching and training aids for the new Eurotunnel and Eurostar staff since it has been proved to have made people more enquiring and more receptive to information.

The ENS Night Train will already have screens aboard when it is brought into service in 1995 (Miller 1993). However, they will not be interactive, and only convey passive information. They are called *VPIS* or Visual Passenger Information Systems and will be located at the entrance of each carriage. These Liquid Crystal Display (LCD) screen will give information about;

- the carriage number
- destination information
- times
- weather
- advertisements

as people are boarding, not necessarily all at the same time. The location limits their use while the train is moving and will not be obvious enough to be noticed by all the passengers. Once the trains and their services have been established there will be a strong possibility of TV monitors in cabins and possibly placed in the back of seats. However innovative concepts such as these are more likely to be implemented by Richard Branson's Virgin travel empire first.

As indicated at the beginning of the project, the idea was to study how an interactive system may be applied to one or a number of elements involved with the Channel Tunnel. *Multimedia* as it says is a number of different media on a computer based system which requires;

- a large memory storage area
- a large access memory for accessing different information areas
- instant access and instant machine response
- an ability for video and or animation
- easy maintenance or replacement
- instant and easy upgrading

Below are a number of items which potentially may be used for such an integrated interactive system for potential use for the Channel Tunnel;

text and hypertext

Text allows the individual to read and understand certain information areas related to the channel tunnel. Hypertext would take this one step further allowing navigation into a further layer through keywords or phrases.

The Evaluation

9.1 The Strategy

An evaluation usually takes place once there is a completed, or a partially completed working *prototype design*. Since the information in question is part of a large and complex system a smaller more focused area has been designated for design to a set of guidelines and a standard grid which would continue throughout the design.

The aims of the project were to;

- assist passengers using the Channel Tunnel link using information aids.
- to convey information that cannot be achieved successfully by printed media alone.

9.2 The Questions

The idea was to try and convey information about the Channel Tunnel, its facilities, the way the procedures works and other areas of relative interest to the public without creating unnecessary *anxiety*. The questions to be asked are for;

- the evaluation and effectiveness of the screen graphic design.
- the conveying of the information content and its validity.

The results of the evaluation should identify positive areas to be enhanced, identify potential problem areas and reveal attitudes and feelings about the information system. A broad scope of audience would view a still sequence of the screen shots and answer the following questions;

What is your occupation ?

What is your age range ? 16-20 21-25 26-35 36-45 46-55 55+

Marital Status ? single married

How many children do you have ? 0 1 2 3 4 4+

Would you use the Channel Tunnel Link at present ?

unlikely	likely
0 1 2 3 4 5 6 7 8 9 10	

Will you use the Channel Tunnel in the future once it has been running for a period of time ?

unlikely	likely
0 1 2 3 4 5 6 7 8 9 10	

How much do you know about the

passenger services which are available for
the Channel Tunnel ?

a little a lot
0 1 2 3 4 5 6 7 8 9 10

Would you use the Channel Tunnel if it was experienced by friends and then recommended to you ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

What information would you *require*, and feel that it was *important* to know about the Channel Tunnel if you were to use it ?

Would you require;

Safety information ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Emergency procedures ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Train Facilities ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

How to obtain a ticket ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

The train layout and your seat/car location ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Train timetables ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Help or assistance ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Telephone location ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Toilet location ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Train Terminal Information ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Disabled facilities ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Weather Information ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Road Traffic Information ?

no yes
 0 1 2 3 4 5 6 7 8 9 10

Clock Display M a little 0 1 2 3 4 5 6 7 8 9 10 a lot

Clock Display N a little 0 1 2 3 4 5 6 7 8 9 10 a lot

Clock Display O	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Clock Display P	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Clock Display Q	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Clock Display R	a little	0	1	2	3	4	5	6	7	8	9	10	a lot

Look at the different DATE DISPLAY STYLES in Picture 5

How much do you like;

Date Display A	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Date Display B	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Date Display C	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Date Display D	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Date Display E	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Date Display F	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Date Display G	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Date Display H	a little	0	1	2	3	4	5	6	7	8	9	10	a lot
Date Display I	a little	0	1	2	3	4	5	6	7	8	9	10	a lot

Any other comments

.....

Look at the TYPEFACE STYLES on pictures 6 & 7

How readable do you find each one ?
... and which ones do you like ?

HAMMER FAT	<i>readability</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
	<i>likeable</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
HELVETICA	<i>readability</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
	<i>likeable</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes

TIMES	<i>readability</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
	<i>likeable</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
FUTURIST	<i>readability</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
	<i>likeable</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
ROTIS	<i>readability</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
	<i>likeable</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
CASLON	<i>readability</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
	<i>likeable</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
OPTIMA	<i>readability</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
	<i>likeable</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
FRITZ QUADRATA	<i>readability</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes
	<i>likeable</i>	no	0	1	2	3	4	5	6	7	8	9	10	yes

Are the TYPEFACES used on the screens
clear and readable ?

no	yes									
0	1	2	3	4	5	6	7	8	9	10

Any other comments

.....

Look at the REMAINING screens

Do you like the look of these screens ?

no	yes									
0	1	2	3	4	5	6	7	8	9	10

How well do you feel the FOREGROUND/
BACKGROUND colour contrast works on
the screens ?

doesn't work	works well									
0	1	2	3	4	5	6	7	8	9	10

Do you feel that the SCREEN TEXT
is easily readable ?

no	yes									
0	1	2	3	4	5	6	7	8	9	10

Any other comments

.....

Is the initial LANGUAGE SCREEN clearly
identifiable ?

no	yes									
0	1	2	3	4	5	6	7	8	9	10

Is the "HOW DO I USE THIS" content clear and understandable ?

no yes
0 1 2 3 4 5 6 7 8 9 10

Any other comments

Do you like the look of the TITLE BAR at the top of each screen ?

no yes
0 1 2 3 4 5 6 7 8 9 10

Do you feel that the items in the TITLE BAR are readable ?

no yes
0 1 2 3 4 5 6 7 8 9 10

Do you like the CLOCK DISPLAY STYLE chosen for the screens (in the title bar)?

no yes
0 1 2 3 4 5 6 7 8 9 10

Do you feel this CLOCK DISPLAY is sufficiently readable ?

no yes
0 1 2 3 4 5 6 7 8 9 10

Any other comments

Do you like the DATE DISPLAY STYLE chosen for the screens (in the title bar)?

no yes
0 1 2 3 4 5 6 7 8 9 10

Do you feel this DATE DISPLAY is sufficiently readable ?

no yes
0 1 2 3 4 5 6 7 8 9 10

Any other comments

Are the OTHER INFORMATION AREAS shown easy to read, in general ?

no yes
0 1 2 3 4 5 6 7 8 9 10

Are the OTHER INFORMATION AREAS shown easy to understand ?

no yes
0 1 2 3 4 5 6 7 8 9 10

Any other comments

Is the SAFETY INFORMATION clear and

Interactive Design Solutions (*pre-evaluation*)

video

This would give a good idea of what the trains and terminals look like, how to navigate around them and therefore how to anticipate situations. This is particularly useful if caught in an emergency or evacuation situation.

graphics

The use of graphic design to create designs for each hyperscreen, to design icons, typography, to stylise and contrast between different levels of information and to design interactive buttons.

animation

For creating model journeys and navigation simulations around a train or terminal in order to reveal required information.

audio

To co-inside with video footage, giving verbal information and instruction in a number of languages, revealing sounds and calls in an emergency or evacuation situation and in other areas, such as tourist information, creating a simulated atmosphere.

A Touch Screen facility

An important consideration when designing a set of hyperscreens with the facility of video, audio, graphics etc. The ability to use a well designed button display to enable the viewer to stop, rewind, move forward and play certain areas of interest, is vital in the system.

Printed Media

Should the system completely break down leaflets with abstracted important information for each respective European country should be made available.

The more advanced a technology becomes the less the user should be aware of that technology. The hiding of the technology and the revealing of good interactive design elements is becoming essential. Let the masses see what they need to know and nothing else.

" It is computers that must become more human, not we who must become more like computers. The opposite process must take place, where the computer must appear as a seamless part of the user's experience, that its presence is hardly noticed. "

Professor B Shackel

8.4 Touch Screen Presentation

With the facilities available a number of proposed screen designs were produced in the Desktop Publishing package QuarkXpress, and shown to a range of people in the evaluation in Section 9. The screens were then saved as Encapsulated Postscript (EPS) files, *a block of defined information*. They were opened in Adobe Photoshop and saved as pictures (PICT files) in order to transfer them into the animation program of Macromind Director. A simple

sequence of the screens were then produced by creating invisible buttons over the pictures giving the viewer an idea of how the screens would work interactively.

Many of the following design solutions remain theoretical at the present time and remain under trial due to the difficulty in obtaining a firm client for the project.

Whatever service an information system is to be introduced for, be it Le Shuttle, Eurostar, the night train or the proposed fast rail link between London and Folkestone the design should complement the service, be of good quality with a clear timeless set of screens, traditional but contemporary.

10.1 Information Content

With an interactive system the content has to be selective concise and appropriate. Until a focus for the project by a client has been found the information content remains open, but still relevant to the subject of the Channel Tunnel. Through the study many areas have appeared which are of possible interest to the user, or customer, be it someone who is to use the Eurostar, Night Train or Le Shuttle. Many of the ideas remain subject to trial.

General Information

This area already includes the **date** and **time** in England and France incorporated into the design and are easily viewed. However other useful information related to **weather** and weather forecasting and the different **temperatures** in each country should be made readily available.

Safety

Safety is a prime thought in peoples' minds when using the tunnel and therefore clear and concise information in what to do in an emergency may reduce an individual's anxiety. So an information section on the procedure if a fire or breakdown occurs is foremost in the design. For the Le Shuttle services a safety explanation in traffic flow and the procedures for embarking and disembarking would be of importance to the passenger. **Emergency** procedures should also be made available to all passengers initially through printed media and or verbally or through radio intercom. An interactive system such as this may be able to convey more detailed examples of how to approach such a situation.

Facilities

Facilities on board the trains as well as in the terminal are also a requirement in such a system. The location of toilets, bars and refreshments, telephones, carriage numbers, luggage storage are interactive possibilities. In the case of the Night Train 'in cabin' facilities may also be located via a map, plan or

animated or video sequence. **Navigation** around the train is important and knowing where items are in relation to other items and an individual's location. Again this may be achieved by plan and or 3D animated views of the train with highlighted areas as and when required.

These ideas are subject to trial.

Timetables

A network of **timetables** for the trains are good to enable planning for a return journey, or for those who are waiting at the terminals for arrivals. Electronic timetabling, already a networked idea on British Rail, is also a possibility for the Channel Tunnel services. It may be altered and constantly updated if trains are late or cancelled and may be complemented by voice or intercom messages.

Help or Assistance

Information indicating where **help or assistance** in the terminals or on the trains, where the manager or guards are located or indeed where an information desk may be located. This may be especially useful in unfamiliar or foreign surroundings. An indication where telephones are, for assistance and emergency advice should also be trialed.

Terminal Building Information

In the **terminal building** there are many facilities as on the train and the system should indicate what and where they are including a possible animated or video navigation sequence around the terminal with sound and interactivity depending on what the individual requires. An indication of where information desks or areas are located may also be necessary similar to the train. Meeting points are also particularly important to specify, a good focal point for people who are coming from abroad and are not familiar with the terminal surroundings and are meeting somebody on an important engagement.

Disabled Facilities

All new design, should, if not already, cater for **disabled persons** and therefore information revealing where disabled facilities are, how to locate them and use them may also be necessary, be it on the train or in the terminal. The physical requirements of therefore having clear sound, clear concise text and simple related animated or video sequences to try and cater for as many disabled afflictions as possible.

Tourist Information

Tourist information is an extra, not essential, but useful to the continental traveller or the United Kingdom traveller. A list of further outlined ideas appear in *Appendix 7* but in addition useful Language phrases may be applied as a sub-section heading.

Duty Free Shopping

As with Galleria 21 in *Appendix 9* **Duty Free Shopping** is commercially viable although not essential to an information system. It does, however, create money injection for the system by bringing in consumer credit.

10.2 Graphic Considerations

Much of the following design remains untested and open to criticism because there is no real corporate identity for certain elements to be related to at the present time.

Media Selection

The initial question about **media selection** for a project such as this is, "*how the information is to be portrayed through that media ?*" After meeting Clive Van Heerden at CRL Thorn EMI research laboratories and looking at their interactive designs produced in last few years. Personal computers have reached such a stage that their advancement would now allow a Macintosh or PC to hold much more storage and access memory than when CRL produced a number of prototype transit systems and retailing systems during the last five years. As explained previously in Section 8 a machine conveying interactive information would have:

- physical constraints – the size of the machine, the screen and its housing. This would co-inside with the availability of prime areas in a Channel Tunnel terminal to locate it.
- technological constraints – as explained previously in Section 8 the constraints are mainly memory storage, memory access and the capability of a machine to efficiently run multimedia software using video, sound animation and text scrolling.

The hardware, if installed at the present time, after talking to Clive Van Heerden at CRL, would probably consist of either a high level 486 or Pentium PC with video and sound card capability and as much memory as is required. A Power Macintosh with multimedia hardware and a fast internal processing

unit, again with as much access memory and storage memory as possible. Software used on the work at CRL include Supercard, Supertalk with the facilities of importation from other Macintosh drawing and Adobe Photoshop image manipulation packages. However some of their work was produced by the programming department using languages such as Lingo, C and Pascal. Some of the technical programming does compromise the design process. **Touchscreens**, although very useful and innovative remain to have teething troubles in recognition. This is true in the case of the PC and Macintosh. There is, however, a sensing platform that may be fitted to the base of any monitor and turns it into a touch screen (*see Appendix 6*). This may be a possibility for this design allowing it to be versatile. This remains open to trial. The Galleria 21 duty free shopping machine in *Appendix 9* was designed by the cash machine makers NCR, and may also be an alternative. However from my conversations with Mr Mike Adams at Galleria 21 the whole unit including product and graphic design was put together internally through NCR and therefore there may possibly not be so much room for flexibility.

Size and Location

The **size** chosen for the **screen** is 17 inches, both standard for the Macintosh and PC. The is both large enough to attract a user, yet small enough to be housed in a terminal as a single or set of information points. Should an information point be available on one of the Channel Tunnel trains, a 14 inch monitor design has been adapted. The **location** of the units should be in a well used passenger area or relaxation area, such as near noticeboards, lounge or cafe areas. They must, however, not restrict the flow of passengers or access to emergency exits for health and safety reasons. If located on board the train the ideal place would either be at the end of each carriage, or in the future, mounted on facing seats or drop down monitors. This, however remains to be seen, with changing technology and adequate financial backing this may become possible as well as popular. As Clive Van Heerden at CRL said, it will just take time before people become aware, accustomed and therefore less afraid of these systems. The human touch is still required at the present time.

Layout and Legibility

The **layouts**, as indicated previously, are clear, attractive, concise and to the point yet convey the information efficiently to keep the viewer interested and educate them. Legibility of the the layout and content is foremost in order to obtain a positive audience response. The typeface for such a design is most important. Different **typefaces** are appropriate for different areas of design. Their **legibility** varies at different sizes for different faces. Serif faces are more decorative and have a more traditional look, whereas sans-serifs are more modern and proven useful in signage and Information Design. Forms of the fonts Helvetica, Univers and Fruitiger have especially been successful. Sans-serif in airport are very clear in Upper and Lower case as explained further in

Appendix 3 and is proved to be simple to read. The new electronic timetabling system for British Rail uses large sans-serif type on television monitors allowing an individual to read at distance.

Typography

Although screen designs for touch screen have to be attractive and recognisable from a distance and easy to read close up the typeface may not necessarily have to conform with the existing information design systems. Computers have changed typography and the way and the speed a typeface may be formed. Many new sans-serif, serif and **semi-serif** typefaces have been produced, classic in appearance but also contemporary. This report is produced in Optima, a modern semi-serif face. A semi-serif face can also be very stylish which may complement the class of the **Eurostar** service be it in a terminal or on the train. In the designs the screens have semi-serif faces although sans-serif remain a possibility. *The typography will have to be a certain minimum size depending on audience readability, screen resolution and possible resonance. A trial for type legibility in a working model or prototype with semi and sans-serif would be necessary before proper implementation.*

Video and animation

If sample filming were produced for emergency procedures or revealing facilities it would be produced in **video** format similar to the videos now on Britannia airlines. A small video presentation within the screen layout appears, as seen in the following diagrams, and would appear next to related textual content and or with additional narration sound. This would be more passive than interactive, but again remains open to trial.

Illumination and Colouration

The **light** sources of the unit are internal and external. The source from inside the unit is from the computer screen. The lighting and colour is dependent upon the screen quality, the resolution, the redraw and the company make. The external illumination from the train lights or terminal lights may interfere or change the appearance of the **colouration** of the screen, namely the contrast of natural blue light during the day and yellow artificial light, so the unit location and colour choice is also a depending factor. The level of external and internal lumination may also obscure the text and video presentations in the system and has been considered. The colouration of housing is an important area. Not only should it complement the screen designs but complement a possible corporate identity.

Language Aspects

From Colette's research (Miller 1993) the **languages** which will appear for the night train facilities are English, French, Dutch and German, covering the immediate European language barriers around the tunnel service routes. However many other nationalities live in these European countries and as and when the Eurostar, fast link and night train services start commercially an audit of nationalities using the train may be made in order to become aware of what possible extra languages may be required. The differentiation in languages on the screens would be a clear directive on the initial introduction screens, that is, allowing the user to choose a language on the first touch, also making the user instantly aware of what and where the touch screen buttons are.

Touch Screen Buttons

Buttons are a hugely important area of design on the screen. The psychological message must get through to the user revealing immediately what and where the buttons are and what they are for. As the buttons are pressed they should appear to emboss or be pressed in similar to that of the Leicester Bus Station information system (see Section 3). Button design is very subjective and therefore different people would react differently to different styles of button. The solutions for the buttons in the main design are not final, they are a preferred solution, still subject to trials and testing. Using a fingerprint in an imaginative way is also one of the more favoured solutions. It is something that people are familiar with, although there is a possibility of making the fingerprints too 'criminal' looking. This idea may also be involved when creating a possible logotype.

Fast Find Indexes

An easy search subject **index** should be considered and possibly be made available. This may be achieved in a number of ways, some of which may not have been considered yet. The design or designs of an index should follow the flow of the other screen designs, but with contrasting features to identify it as an index section. This is especially important in the hypertextual role. Again any implementation would be open to trials and testing. The following ideas have been considered at present;

- having an index touch button on screen constantly which when pressed would reveal a set of index cards or a menu in a roll up and down touch menu.
- having access to an index or indexes at the beginning, near the introduction.

An indexing system is a way of finding information by searching through a

form of hierarchy, the choice of path or route finding certain elements or subjects. Many people have different ideas of what an index should look like or how it should be accessed. Therefore the design sketches on the following pages are indexes which use *alphabetical*, *numerical* and *self typing* format. A choice of index for a user may be possible as indicated on the screen designs, although it may be said that a well designed index may not require a choice or selection. It should be obvious how the index works. An additional area for using icons or symbols to aid language differentiation, to clarify certain subject areas and to give identity in an index. However this is open to design interpretation, experimentation and then through trials and testing with users.

A **keyboard index** would certainly require refinement. If a certain subject is typed such as toilets, would it refer to the toilets on the train or in the terminal. Would the user also be required to type the whole word, or would it be recognised on the first number of letters, such as the first three letters on the British Telecom directory enquiries computers. There are many questions to be asked about this type of index. The hypertext routes have to be clearly defined in order that typed instructions would only refer to an identified screen on an identified route. *(For route clarification and explanations see the flowchart at the very end of Section 9)*

10.3 The Designs

Over the following number of pages are hand drawn and computer sketches revealing **screen design ideas**, and **elements** on the screen, like buttons, which were tackled individually. A contrast in colours have been used and vignettes of colour used to create the illusion of raised buttons. However these areas remain open to trials and testing. The initial screen designs over the page, before any client review, and change due to corporate identity colouration would consist of the following colours:-

Dark Green	100c74m88y
Yellow	100y10m
Grey	11.5c18.5k
Light Green	47c30y
Dark Blue	79c38m76k
Mid Blue	100c79m47y
Red	100m100y
White	
Black	

The colours listed above also appear as tints and tones and gradient vignettes. Some of the colours above follow a similar colouration to the Eurostar colour identity, but remain open to further recommendations, changes, and trials and testing. The non-screen colour visuals follow a CMYK four colour print process, similar to that of magazines or newspapers. However, on a screen these colours may appear different. Pantone or other colour standards may be

substituted, if necessary.

When a button is pressed, the button appears to be pressed in with slight movement down and to the right with a screen embossing effect. The edges of the buttons appear as a vignette from dark to light green, that is 100c74m88y to 47c30y.

Note: With the button design, no matter how the design is reviewed and changed during trials only buttons to be used for a particular screen should appear and be removed completely when not in use to reduce and distraction and technological anxiety.

The **date** and **clocks** remain under review, but should not be designed too small due to screen resolution, contrast, brightness and resonance. The clocks have been designed to cater for both analogue and digital awareness for Folkestone and Calais. The time and date are vital pieces of information for the traveller, allowing a passenger to gain his or her bearings in unfamiliar surroundings and allows planning. From the study of interactive systems in the preceding sections the time appears on almost all the systems as does the date. Even if either does not appear they remain present in the computer's memory to keep track on the system for possible printout time and date verification, such as on NCR bank machines, or for auditing and marketing purposes.

With this in mind all the text sizes have been thought about and should not be less than a certain point size where the screen resolution would interfere with the legibility of the text. **Scrolling** has been implemented for some of the text, this is not very advisable (and may possibly be changed for a series of screens) but achieves the space in which to cater for the differences in language word and sentence length.

Conclusions & Recommendations (*post evaluation*)

11.1 Evaluation Results and Conclusions

Even though just over thirty people answered the evaluation questionnaire, there were a number of problems in that the colour screen stills shown in the portfolios were separate screens, not on a single screen as they would be in reality. Even with a full explanation on the question paper the viewing of separate screens became a little confusing to a number of people. The information given in the questionnaire may have been a little too much and too heavy. It also revealed that a number of questions were improperly located with the questionnaire. The following points were brought up by the questionnaire and indeed if a further number were processed further areas of opportunity would arise for consideration and improvement.

-

- As indicated in Section 8 **scrolling** is not a good idea but in some cases may be necessary in order to compensate for language sentence size differentiation. The other more attractive alternative is to produce a set of screens each of which sequentially follow another with defined information layouts that are passive and may be read in stages rather than interactively scrolling through with a single screen. The variety also keeps the viewer interested if the layouts are well designed.

The literature and primary research study has, revealed much of the background and history of the Channel Tunnel and multimedia development. The knowledge obtained through contacts and interviews has enabled a view of where design, installation and user problems arose on previous multimedia and interactive multimedia systems and projects. It has revealed how the gradual introduction of multimedia into home computer systems and how 'ready information' is becoming more available. Many new public interactive systems have been installed over the last year, most recently Thomas Cook, The Glades shopping centre *local touch* guide in Bromley, Kent (Evamy 1995) and more are to come in the near future with the explosion of the digital information highway and the INTERNET.

New technological advances are forcing people in the commercial and business world to come to terms and join the new computer age. However there remain many traditionalists who still do not fully understand, or do not wish to fully understand and therefore the simpler and clearer the design, the easier the ability to learn and understand from basic principles.

The Channel Tunnel is now open for service after all its initial teething troubles. The Eurostar appears to have been a success, so far, even though the

prices remain very high. Le Shuttle is carrying passengers, and after being through the tunnel myself I believe there is very little to worry about being under the water for approximately 20 minutes. It is very similar to being underneath the weight of the city of London on the Underground. However, the one overriding concern of the channel tunnel, as revealed before in the text and in references is the **safety** element which creates most of the *anxiety* and as proved by the Kings Cross fire tragedy being underground in a fire can be fatal. Similarly being under the sea, in the dark, on a train there is no individual control of (such as being control of a car), with the risks of fire, water and terrorism it is no wonder that many people will still go by ferry and hovercraft. However, if the fear cannot be combatted then perhaps it may be reduced by making factual information about the tunnel readily available to the masses through interactive means.

11.2 Recommendations

When it comes to the screen designs every individual will react to an interactive system differently, some with fear, frustration, excitement or anxiety just to mention a few. This is why the screen designs must be continually questioned and improved.

In this project the designs proposed so far from the research are really just the tip of the iceberg. Much of the design work requires more trials and testing and as with all design, improvements should be made with this project and indeed can be made.

The **screen typography** should be looked at continually, experimentation with the sizes and styles, contrasts and relationships and appropriate colouration. As the computer screen and the touch screen develop and resolution becomes greater the typography may be able to become finer, smaller and more defined yet remain of a readable standard.

The date and time presentation on screen should also be reviewed. People buy different watches because they prefer a certain style, and therefore some will not feel visually as comfortable with a range of **time** presentations as with others. Hence the design reasoning for both analogue and digital facades. British Rail have a very clear standardised digital clock system on all their stations, large yellow digital numbers with a bright red border. It even ticks so a traveller can locate it by sound if it is not immediately visible. The analogue clock on BBC television is also a good example of this being prominent, yet cool in design. There will always be the traditionalists who will prefer an easy instant picture of the time with hands and face. **Date** formats read differently for different countries and cultures. Notably in the United States and some of the Far Eastern countries where their date format is month/day/year, whereas in Europe it reads day/month/year. Although they are all reasonably similar, the design sketches in Section 10 should be reviewed and tested further for recognition and ease of interpretation and legibility. A further look into the psychology of how people react to clock and date design would be more

favourable to gain more conclusive evidence.

The **on-screen button** is one of the most complex and critical areas of design because it is difficult to please all of the people all of the time. Existing interactive information systems with touch screen buttons and new interactive video games have individually designed buttons. These show how a designer thinks a definitive interaction should be revealed through a certain styled on-screen element. The questions to be asked are how does a designer produce a standard button for a public information system, and when a button is not required for a decision point how is it to be reduced in importance without creating a situation of anxiety. That is, 'too many buttons, which one do I use?'. Therefore button size and styling and methods for 'fade out' have to be considered and tested, and vehicles for making buttons familiar and attractive.

Through this study, the physical structure of the tunnel has been shown to be very strong as revealed by a number of the Equinox videos in the De Montfort University (Kimberlin) Library. If a focus on the existing positive safety aspects of the tunnel design can be harnessed rather than the potential negative problems, it may persuade the psychology of the traveller or potential traveller.

Accidents have happened in other tunnels before. Who's to say the Channel Tunnel is much different. It may well be much easier to evacuate due to the easy access of the service tunnel and the advanced design planning with the good communications created by state of the art technology. But until the time comes when a real emergency arises there will be no non-theoretical information. Lets hope it never happens!

11.3 Future Developments

Eurotunnel High Brightness Screen Designs

- The Brief
- The Approach Strategies
- The Investigation
- The Constraints
- Classification and Rationalisation
- Production

11.4 Appraisal

Appraisal

- Anderson, Jeff (1993) Mastering Multimedia Sales and Marketing Management
Vol 14 no 1 Jan pp55-58
- Barker, P(1990) Designing Interactive Learning Systems Education and Training Technology Int
Vol 25 May pp125-145
- Binney, Marcus (1992) Fast track into the 20th Century: Arts The Times Sep 28th pLT/3
- Blackwell, Gerry (1991) The new frontier Canadian Business
Vol 64 no 11 Nov pp85-94
- Bond, Michael (1994) All aboard the 15 billion dollar shuttle The European May 6th-12th p5, 9
- Brugger, Christof (1990) Advances in the standardisation of public information symbols Information Design Journal 6/1 pp79-88
- THE BUILDING REGULATIONS (1994) General Provisions common to buildings other than Dwellinghouses Part B1 Section 5 pp41-45
- Burley, I (1992) Pandoring to Big Brother Personal Computer World Feb pp242-244
- Carroll J.M (1990) The Numberg Funnel
The MIT Press, Cambridge
- Chain Store Age Executive (1992) Retailers turn to kiosks Chain Store Age Executive
Vol 68 no 4 Apr pp42-43
- Chief Executive of the Consumers Association (1992) Safety factor in the Channel Tunnel The Times May 12th p13
- Chisnall, Peter (1992) Market Research 4th Edition
McGraw Hill, Maidenhead
- CIO (1993) A multimedia circus CIO Vol 6 no 12 May 15th pp14-16
- Computing (1992) Multimedia authoring software Computing June 25th pp27-28
- Cotton, Bob & Oliver, Richard (1993) Understanding Hypermedia
Phaidon Press Ltd, London
- Couldwell, Clive (1992) Myriad messages strike home:Infotech Multimedia The Times July 31st p26

- Counsell, Gail (1993) Channel ports see gloom at the end of the tunnel
The Independent Feb 15th p21
- Dahmer, Bart (1993) When Technologies connect
Training and Development
Vol 47 no 1 Jan pp46-55
- Davies, James (1994) Five Month delay hits Le Shuttle crock
The Daily Express Apr 22nd p7
- Devas (1993) The UK Tourist Outbound- A Market Profile 4th Edition
TPR Associates, London
- Dunford M, Holland J, Lee P (1990) Holland Belgium and Luxembourg: The Rough Guide
Harrap Columbus, London
- Dupont-Nangle, Christiane (1994) Light at the end of Sir Alastair's Tunnel
The European Apr 29th-May 5th p28
- Dynes, Michael (1992) Continental Sleepers challenge airlines
The Times May 25th p2
- Dynes, Michael (1992) BR cuts rail link options to ten
The Times Aug 22nd p5
- Dynes, Michael (1992) A trip to France under the sea: Channel Tunnel
The Times Oct 8th p18
- Dynes, Michael (1992) BR offers glimpse of a new era in rail travel
The Times Oct 12th p15
- Dynes, Michael (1992) Eurostar 186mph trains promise London-Paris trip in three hours
The Times Oct 29th p6
- Engel, Matthew (1994) To Hel and back
Media Guardian Nov 14th pp2-3
- Eurotunnel (1990) The Channel Tunnel: A 21st Century Transport System
The Channel Tunnel Group Ltd
- Eurotunnel (1993) Progress in pictures 1991-1993
Polkinghorne Bikerton Bennett, Tunbridge Wells
- Evamy, Michael (1995) Terminal Disarray
Design Week Jan 6th pp12-13
- Fisher P and Sless D (1990) Information Design methods and productivity

- Information Design Journal 6/2 pp103-129
- Fitzsimons, David (1991) New ways to use technology for benefits communication
Journal of compensation and Benefits
Vol 7 no 3 Nov/Dec pp59-63
- Focal Signs (1993) Safety Signs: The total solution
Focal Displays Ltd, Surrey
- Fox, B (1991) Multimedia in a muddle
New Scientist Sept pp35-39
- Gallagher, W (1992) Lights, camera...
Personal Computer World
July pp298-300, 302
- Ghazi, Polly (1994) Time runs out for families to escape Chunnel blight
The Observer Apr 17th p6
- Gibson, Jim (1992) Multimedia Development: What it takes?
Canadian Manager
Vol 17 no 3 Sep/Oct pp23-26
- Glancey, Jonathan (1993) Functional face of Channel Terminal
The Independent Feb 25th
- Gutteridge, Adam (1988) CD ROM entering a new era
Computing Canada
Vol 14 no 22 Oct 27th pp74-75
- Gyorki, John (1992) Operator Panels: From Dull to Downright Sexy
Machine Design
Vol 64 no 16 Aug 6th pp 33-40
- Hallahan, Sean (1992) Sailing towards a new world: Infotech Multimedia
The Times July 31st p26
- Hampshire, N (1992) Smart TV
Personal Computer World May pp230-232
- Hawkes, Nicholas (1992) New Horizons for Signs in Air Travel
BA Graphic Design Project, Ravensbourne
College of Design and Communication.
- Hewson, David (1993) Education:Information unlimited: When one disk can teach anything
The Independent March 18th p17
- Hicks, R & Essinger J (1991) Making Computers More Human; designing for

- Human Computer Interaction
Elsevier Science Publishers Ltd
- Homer, Steve (1993) Home Computer: Mapping the future of personal technology
The Independent Apr 2nd p29
- Hughes, Christine (1990) A moving story: Multimedia stakes its claim on the desktop
Computerworld Vol 24 no 23 June pp SR27, SR30
- Image Technology (1991) Micro Gallery
Image Technology Aug pp312-312
- James, Helen (1988) Tunnel Vision: A study promoting the use of simulation methods in signing system design
MA project, De Montfort University (Leicester)
- Johnson, P (1992) Human Computer Interaction
McGraw-Hill Book Company, London
- Kanji, A (1992) Interactive Multimedia Tutoring
MA project, De Montfort University (Leicester)
- Kent County Council & Eurotunnel (1993) European Junctions
The Channel Tunnel Group Ltd
- Kiener, Robert (1994) Under the Channel on top of the World
Reader's Digest May pp54-60
- Kinross, Robin (1993) Paul Mijkenaar: a conversation and a lecture
Information Design Journal vol 7 no 2 pp105-114
- Knutton, Mike (1994) Aiming for the second age of railways
The Daily Telegraph (Business Travel 3)
Nov 15th p3
- Laverty, Denis (1988) Design on Screens: Graphic Design at the Human Computer Interface
MA project, De Montfort University (Leicester)
- Lawler, Edmund O (1993) Looking to the Future
Business Marketing Vol 78 no 7 Jul pp52-53
- Levin, Bernard (1992) Where even safety is a secret
The Times May 28th
- Little, Thomas (1991) Multimedia as a network technology
Business Communications Review
Vol 21 no 5 May pp65-7

- Ludlow, Chris (1994) Signs? What signs?
Ideas no 12 pp1-7
- McGourty, Christine (1994) Gone Shopping-electronically
Daily Telegraph Apr 4th p12
- Massey, J (1990) Backing the right horse
Management Computing Oct pp79-81
- Meggs, Philip B (1986) A History of Graphic Design
Penguin Books Ltd, Middlesex
- Meredith, Greg (1993) Dispatching of the vanguard forces will make it a hot medium
Computing Canada May p14
- Millward, David (1994) Will passengers please take their place in history
The Daily Telegraph Nov 15th p11
- Miller, J.Colette (1993) Night Vision: Information Design for the Channel Tunnel Night Train
MA project, De Montfort University (Leicester)
- MINTEL Report (1993) Channel Tunnel Leisure Intelligence
Special Report Vol 4
- Murie, Michael D (1993) Macintosh Multi-media Workshop
Hayden Books, Indiana USA
- Murray, Dick (1994) A new era for the island race
The Evening Standard (London) May 5th pp16-17
- Newman, Cathy (1994) The Light at the end of the Chunnel
National Geographic Vol 185 no 5 May pp37-47
- Nicholas, Ruth (1994) M&S boosts its service options
Marketing March 17th p5
- Nicholls, Paul (1992) A guide to the new MPC titles
CD ROM Professional Vol 5 no 5 Sep pp113-117
- Nuttall, Nick (1992) Channel Tunnel is top phobia
The Times Aug 8th p2
- Payne, Eloise (1991) The action is interactive
Foundation News Vol 32 no 2 Mar/Apr pp58-60
- Pitt, Alan (1993) The Project of the Century
Kalligraphic Design, Surrey
- Platt, George (1993) Digital Media
Direct Marketing Vol 56 no 4 Aug pp37-41

- Plowden, Stephen (1993) Letter: Light at the end of the tunnel or a disaster for the people of Kent
The Independent Mar 27th p17
- Ricciuti, Mike (1993) Making Multimedia work
Datamation Vol 39 no 17 Sep 1st pp30-34
- Rice, Alistair,
Dennis & Sampson (1994) Hi-tech tunnel enterprise
The Sunday Express Jan 9th p24
- Roberts, Sally (1992) Benefits Communication at the touch of a button
Business Insurance Vol 26 no 41 Oct 12th pp3-6
- Shneiderman, B (1987) Designing the User Interface
Addison-Wesley Publishing Company, England
- Sims, Mitzi (1991) Sign Design
Thames and Hudson Ltd, London
- Society of Typographic Designers (1993) Adventure on the Underground
Typographic no 45 (supplement)
- Sunday Times (1990) Channel Tunnel
Sunday Times Magazine Nov 25th pp24-32
- Tieman, Ross (1994) Looking for the light at the start of the Channel Tunnel
The Times May 2nd
- Trafalgar House (1992) Trafalgar terminal plan
The Times May 22nd p20
- Wickers, David (1992) The hole story: Channel Tunnel: Travel
The Times Sep 27th p5-7
- Williams, Wayne (1994) Learning the Lingo
Multimedia and CD-ROM Now no 1 pp44-45
- Wolmar, Christian (1993) A tale of two terminals
The Independent May 30th p9
- Wolmar, Christian (1993) Channel tunnel trains will not sell refreshments: Operator provides lavatories but not other facilities
The Independent Dec 14th p4
- Wolmar, Christian (1994) Channel Tunnel will miss summer holidays
The Independent Apr 1st p1
- Wolmar, Christian (1994) Channel Tunnel becomes a victim of unrealistic targets
The Independent Apr 1 p7
- Wurman, Richard Saul (1991) Information Anxiety

- Young, David (1992) Pan Books, London
Eurotunnel dismisses fire fears
The Times May 8th p3
- Ziegler, Bart (1993) American telephone & multimedia?
Business Week no 3335 Sep 6th pp78-79

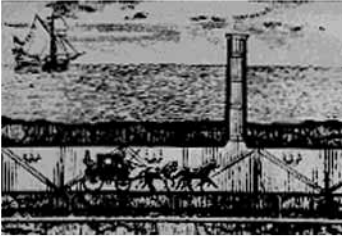
.....

Video Bibliography

Adams, Douglas (1990)	<u>Hyperland</u> BBC2 Sep 21st
Channel Tunnel	<u>The Breakthrough</u> BBC TV
Equinox (1994)	<u>Cyberville</u> Channel 4 productions
Equinox (1987)	<u>Taking the Tunnel</u> Channel 4 productions
Equinox (1987)	<u>How they built the Channel Tunnel</u> Channel 4 productions
Eurotunnel (1993)	<u>Eurotunnel</u> BBC2 May 13th
Information Technology (1987)	<u>Interactive Video</u> Software Production Enterprises Ltd
The Tunnel	<u>The Tigers' Tale</u> BBC TV
Tomorrows World (1990)	<u>Tomorrows World</u> BBC1 Apr 14th
Tomorrows World (1994)	<u>Tomorrows World</u> BBC1 Feb 11th

- Appendix 1 **History of the Channel Tunnel**
- Appendix 2 **Literature Indexes**
- Appendix 3 **Contact Names and Details**
- Appendix 4 **Case Study (Information Anxiety & Travel)**
- Appendix 5 **Developing a Multimedia Project**
- Appendix 6 **Perex Touchmate**
- Appendix 7 **Tourist Information possibilities**
- Appendix 8 **Learning the Lingo**
- Appendix 9 **Galleria 21 Interactive shopping system**
- Appendix 10 **RNIB Challenging Blindness**
- Appendix 11 **MINTEL Report (1993)
Channel Tunnel Marketing Information**
- Appendix 12 **Design Approach Flowchart**

An Abridged History of the Channel Tunnel



Favier's Lamp Lit Tunnel

The story begins

For almost 200 years, the concept of a Channel Tunnel has inspired engineers pioneers and visionaries. But, until recent decades, it also provoked political suspicion and military unease which effectively prevented any of the many proposed schemes from going ahead.

The story begins in 1802 when French mining engineer *Albert Mathieu-Favier* put forward an ambitious proposal for a lamp-lit tunnel ventilated with chimneys rising above the waves. Impractical and technically impossible at that time, it never left the drawing board.

Tunnel Pioneers

Science and technology advanced in great strides during the industrial revolution, when railway networks made international travel easier. It was in this climate of progress and expansion that more sophisticated proposals emerged, including bridges, submerged tubes and the first railway tunnel scheme.



One of De Gamond's schemes

French engineer *Thome de Gamond* dedicated 40 years to finding a practical solution. He braved harsh marine elements, diving from a boat to the sea bed to take samples. Surviving this tough task, de Gamond went on to conclude that a railway tunnel following a route between Cap Griz-Nez and Folkestone would be the best option.

De Gamond devised 8 different schemes before selecting one for consideration by both nations in 1856. A collaboration between de Gamond and British mining engineer *William Low* produced another scheme, presented to the newly formed Anglo-French Channel Tunnel Committee in 1868, which still could not overcome Britain's continuing suspicion of its closest neighbours intent.

In the 1870's Low continued the quest with fellow engineer *Sir John Hawkshaw*. Together they set up the Channel Tunnel Company in 1872, raising finance by selling shares to railway companies and private investors.



Colonel Beaumont's tunnel

The First Attempt

Finally the political will, finance and technology were available and tunnelling trials began in 1880. The first boring machines created by *Colonel Beaumont* dug beneath Shakespeare Cliff near Dover and Sangatte on the French coast. These tunnel drives may have been completed, but the threats of invasion

prompted the British to stop work in 1882 under parliamentary orders. The French laboured on a few more months before accepting that further progress was futile after much effort and over 1800 metres had been dug from each coast.

The First 20th Century Attempt

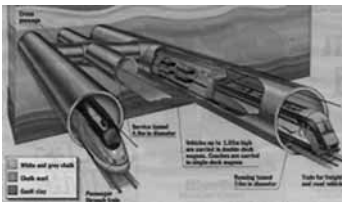
The *Labour Government* cast aside the invasion fears of its predecessors in the 1920's. A trial tunnel was bored at Folkestone Warren, but a mass of political engulfed the project after less than 150 metres had been excavated. There would be no more talk of a Channel Tunnel for 30 years.

The Tide turns

In 1955, Minister of Defence *Harold Macmillan* announced that a Channel Tunnel would no longer be a threat to national security. Therefore, in 1957, an Anglo-French consortium formed the Channel Tunnel Study Group.

By 1960, the group concluded that twin railway tunnels would be the best option. Refined and modifies to include a central service tunnel, this proposal was supported by a joint government declaration in 1964.

However the scheme lay dormant until the two governments' agreed to provide financial guarantees in 1971, enabling French and British companies to get together and start a new project.



New legislation allowed work to begin at Shakespeare Cliff and Sangatte in 1974 but, with only a few hundred metres of service tunnel completed, the project was halted by an unfavourable economic climate.

...and to the present

In 1978, British Rail and French railway company SNCF proposed a six metre single track tunnel system. But the turning point did not come until 1980 when the political leaders agreed to the construction of a tunnel, with the British proviso that it was funded by privately.

Anglo-French studies were commissioned by both financiers and politicians during the early 1980's and the two governments invited private sector bids to finance, construct and operate a fixed link in 1985.

A year later the Eurotunnel bid was accepted, concluding almost 200 years of planning and debate. The dreams of engineering pioneers during this time of technological advancement and historical change finally became a reality.

*The construction of the three tunnels under the Channel is complete.
The grand inauguration took place on 6th May 1994.
Transport by train under the English Channel becomes a reality and a new
story begins...*

Literature Indexes

ABI Inform (CD Rom)

This index gave instant information to newspaper and magazine articles available both on the Channel Tunnel and Multimedia developments from 1987 onwards.

Applied Art and Design index

There were many available references on information and graphic design and Multimedia application articles in the Kimberlin library.

Applied Science and Technology Index

Articles found to be of use were on human/computer psychology and many human safety aspects.

COIN (CD Rom)

Available useful articles on the Channel Tunnel and more especially Eurotunnel and TML, their construction methods, problems and safety procedures.

Current Technology Index

Articles on the Channel Tunnel, safety in general and fire problems.

The Times and Sunday Times (CD Rom)

Newspaper and supplement articles on new developments in Multimedia, for the Channel Tunnel and a few items on safety specifications and problems.

The Independent (CD Rom)

Mainly useful for general articles on the development of the Channel Tunnel and multimedia.

These indexes covered many of the following subjects;

Information and Graphic Design, Information Anxiety-

- British Standards
- Graphic Design
- Information Anxiety
- Information Design
- Psychology and perception
- Safety Information
- Sign Design

Multimedia

- Applications / problems
- Artificial Intelligence
- Development Phases
- Education / Training
- Environmental Effects

Hardware, Software and CD Rom
Hypertext
Marketing
Networking / System Links / Telecommunications
New Technology
Touch Screen systems and Kiosks
Video and sound

Channel Tunnel

Building Design
Cultural Differences
Eurotunnel, European Passenger Services and Transmanche Link
Freight
History
New Technology
Planning
Questions and Answers
Safety and Emergency procedures
Trains and terminals
Travel Anxiety

Below are a number of other magazines and supplements used to gain extra design hints, concepts and ideas for designing a multimedia project.

XYZ Direction

Multimedia- *This was more of a scientific periodical concentrating on the hardware aspects, yet it still had a number of helpful hints.*

Marketing & Marketing Week- *These periodicals revealed the new multimedia system applications being brought out for the consumer. It was helpful showing where and when these systems would be introduced.*

Macuser- *Useful for the knowledge of available multimedia hardware and software packages.*

MacFormat- *Revealed numerous new applications for multimedia and CD Rom programmes for the Apple Macintosh.*

PC Format- *As above but for IBM personal computers and compatibles.*

PC World- *Useful information on exhibitions and seminars regarding multimedia.*

Contact Names and Details

European Night Services

Mark Willcox- Design Manager of the Channel Tunnel Night Train

Telephone Conversation 4th March 1994:

I spoke to him initially about my project intentions, and the possibility of interactive multimedia. He said that he had no such project that had actually been initiated in this area, although there had been some consideration. Mr Willcox said he would speak to his product design department and find how far there would be a possibility of a project, but did not promise anything.

Telephone Conversation 10th May 1994:

I spoke to mark Willcox about the Channel Tunnel in general, what his actual role was and he explained to me that he had been approached by a number of students from different colleges and universities also with a similar intention to my own. I faxed him some very important questions regarding the project, hoping that he would be able to answer some of them, or point me in the right direction.

Letter sent 12th October 1994:

The letter contained an introduction to the interim report of which a copy was sent. The letter asked for any comments on the project as it stood and asked about any other relevant areas of interest.

Nicholas Grimshaw and Partners

George Stowell- one of the architects involved in the design of Waterloo International Terminal

Telephone Conversation 22nd March 1994:

I spoke to George Stowell, an architect who had been involved with the Waterloo International project from the beginning about visiting the station. He required my details and reasons why I wished to see it.

Visit 25th March 1994:

Visited Waterloo International Station at 3:00pm and viewed inside the airport styled terminal and on the platforms. Mr Stowell spoke about the construction, the passenger areas and passport control facilities and security. Marianne, an EPS employee, spoke about the customer service operations to be introduced, including ticket reservation, Eurostar on-board facilities and passenger and disabled passenger flow.

A photographic study was undertaken



Eurotunnel Exhibition

Eurotunnel in Folkestone

Claire Whiddon- one of the design coordinators of the Cheriton Terminal

signage

Telephone conversation 15th March 1994:

I spoke to Claire Whiddon, a designer at Eurotunnel in Folkestone about the terminal approach signage and the digital overhead M20 motorway signage, sets of which precede the Channel Tunnel junction by about 20 miles at regular intervals up to the terminal junction. I mentioned the project idea and the possibility of an interactive information system, and she indicated that maybe it would be better to focus on entertainment and education possibly using geography and language. Claire also pointed me towards *Peter Kendal* designer at European Passenger Services.

A photographic survey of Eurotunnel's exhibition was undertaken on 24th March 1994

Derek Meredith – UK Terminal Director

Letter sent 19th October 1994

The letter was following up a telephone conversation with his secretary Sue Dawson explaining what the proposal was and how it was to be applied if possible. Any comments were asked for about the project ideas as a whole.

Letter received 28th October 1994

He was interested in the project and indicated that Mr Paul Johnson in the New Works Division was looking into the question of passenger information systems at the Folkestone and Calais terminals.

Paul Johnson – New Works Division

Telephone conversation 31st October 1994 5.00pm

He has read the report and explained that he is working on passenger information systems for the two vehicle reservoir areas at Folkestone and Coquelles. A passive information board format conveying anxiety reducing information, and also for commercial use. He indicated that there is a possibility for my inclusion in the a number of design strategies to be tested.

Telephone conversation 15th November 1994 11.00am

I asked how suitable I was for certain areas of the High Brightness screen project. He said that the 'presentation side' would be the most appropriate for me and my project. He gave me a few directional pointers over the telephone but for further information I was to send a fax. He also said to come to Folkestone on December 6th to look around the terminals to take pictures and to ride on Le Shuttle to Coquelles where I may see what is to be designed at the other terminals. The equipment sony is providing temporarily will also be there to view.

Fax sent 17th November 1994 12.00pm



Gatwick Interactive Information System

This contained the questions about the project areas.

Visit 6th December 1994 2.00pm–7.00pm

A visit was undertaken around EUROTUNNEL UK Terminal with Sue Reay (Information Officer). We talked about information screens and what areas they would be in, at what decision points and what the information would be. The differentiation in information depending where the individual is in the terminal at that time. Paul Johnson was unable to make it.

Visit 23rd December 1994 3.30pm–8.30pm

A foggy visit to the terminal at Folkestone. I spoke to Sue Reay and Paul Johnson. They revealed the screens and how they work using 'visual basic' for the PC. I tried to arrange a price and a timescale. They showed me an 'information brief' report. They said they could take me on-board with expenses only, with a view on increasing this on proving my ability.

Letter sent 11th January 1995

To try and gain a copy of the public information brief

BAA Gatwick Airport

Stephen Graham- Systems Development Manager, BAA

Visit 5th April 1994:

I visited Gatwick Airport and met Stephen Graham by the Interactive Information system. He revealed that it had there for 2 years and was due for updating with the flight information boards. He showed me the physical aspects and the technological aspects of the system and how it worked. He revealed that it was designed by USM of Brighton and how the project was taken up from the start to the installation.

A photographic survey was undertaken.



Galleria 21 Interactive Shopping

Galleria 21 (Heathrow) interactive shopping

Mr Mike Adams- Galleria 21 coordinator

Visit 19th April 1994:

I met with Mr Mike Adams, design manager of Galleria 21 interactive shopping system at Heathrow Terminal 4 and went beyond the departure lounge where the machines are housed. He explained how it worked and how it was designed and installed. For further information *see Appendix 9.*

A photographic survey was not undertaken because of security reasons.

BAA Heathrow Airport

Mark Fielder- one of the coordinators of the British Airways Interactive System

Telephone Conversation 11th April 1994

I spoke to Mr Mark Fielder about the old British Airways interactive information system that has been there for 5 years, is out of date and rarely used. He said it needs software redevelopment, only running on Windows system 2 with visual basic. But as with many other projects it is having the time, enthusiasm and money and not having the reasoning of it being 'somebody else's job'.

Argos Interactive

David Crawford- Marketing Manager

Telephone Conversation 20th May 1994

I got in contact with Mr David Crawford the marketing manager at Argos to find out about the new interactive shopping system at the Leicester store. He also indicated that systems were also on trial at Bedford and Hemel Hempstead, and therefore I arranged to take photographs of the system at the Bedford store.

A photographic survey was undertaken on 3rd June 1994

Virgin Management

Will Whitehorn- Corporate Affairs Director

Letter sent 19th October 1994

This indicated the intentions for the project, the possibility of implementation of the project for the fast rail link and any other comments that would have been helpful. A copy of the interim report was sent.

CRL Thorn EMI Central Research Laboratories

Terry Dean- Sales and Marketing Manager

Clive Van Heerden- Interaction Designer

Visit 2nd November 1994

I spoke to Terry Dean about the company, but gained most information off Clive Van Heerden about the interactive design area. He revealed how projects were approached, the problems encountered between himself and the software engineers and introduced a number of completed theoretical projects, including London tram ticketing and cinema ticketing which shows a pictorial view of an individual cinema's seating.

AT&T Telecom (NCR computers and Terminals)

Matt Studholm- Galleria 21 promoter

Telephone Conversation 24th November 1994

Matt Studholm returned my telephone call of the previous day, and explained how to go about accessing people to implement my project and produce it so it works on a fully operational interactive system. He asked me to;

- put together an overview of the project where it was to go, how the system worked and how much it would be used, if possible.
- ... then send it to Paul Rogers (self service marketing manager) at AT&T GIS in London where the project idea would be considered and talked through, and then discussed by the production managers.

Matt Studholm then asked me;

- what I do for a living
- what knowledge and skill I can bring to them
- ... from this point how it then can be agreed to proceed further.

For further information Matt also advised telephoning Touche Ross of London and speaking to the IMRG (Interactive Multimedia Retail Group) section where more background help on implementing a system such as mine may be of use.

Other contacts telephoned, but with little success

Littlewoods Interactive Shop Assistant (L.I.S.A)

Roger Hoe- Head Office in Liverpool

Marks and Spencer Interactive System

Chris Murphy- Head Office

Building Design Partnership

Matthew Winder- Displays department

Century Communications

Janice Kohut- marketing

Thomas Cook (*Travel Kiosk*) Marble Arch Branch

Phil Anderson- co-ordinator

Case Study (Information Anxiety and Travel)

Information Anxiety and Travel

- the design problems
- the user problems
- the continuing search for solutions

..... *"Information Anxiety is produced by the ever widening gap between what we understand and what we think we should understand"*

Richard Saul Wurman (1991)

• Information ?

First of all what is the definition of information. The Collins dictionary says that *information* is

- knowledge acquired through experience, or study.
- knowledge of specific and timely events or situations.
- the meaning given to data by the way it is interpreted.

Similarly the Oxford Dictionary describes *information* as "the action of informing; formation or molding of the mind or character, training instruction, teaching; communication of instructive knowledge."

• Anxiety?

The Collins Dictionary defines anxiety as;

- a state of uneasiness or tension caused by the apprehension of possible misfortune, danger etc...
- intense desire or eagerness

• Information Anxiety?

Therefore what is information anxiety? Richard Saul Wurman, a well respected American graphic designer, architect and cartographer says, "*Information Anxiety* is produced by the ever widening gap between what we understand and what we think we should understand. We are made anxious by the fact that our access to information is often controlled by other people. We are dependent on those who design information, on the news editors and producers who decide what news we will receive. Almost everyone suffers from information anxiety to some degree. We read without comprehending, see without perceiving, hear without listening" .

If there is any doubt as to what he is talking about here is a small list of behaviour indications for possible information anxiety;

- Chronically talking about not keeping up with what's going on around you.
- Nodding your head knowingly when someone mentions a book, an artist, or a news story that you have actually never heard of before.
- Finding that you are unable to explain something that you thought you understood.
- Feeling depressed because you don't know what all the buttons are for on your Video Recorder.
- Giving time and attention to news that has no cultural, economic, or scientific impact on your life.

So what can be done to reduce information anxiety and how this may be applied to transport and travel?

Richard Saul Wurman says;

“Understanding the gap between *raw data* and that which can further understanding and increase knowledge between information as matter and information as meaning, will make you more competent information processors. The increased proficiency should give you more confidence and more control, enabling you to relax. Feeling more relaxed, having less guilt, will permit understanding” (Fig 1).

He continues, “. . .by transcending the anxiety of not knowing, you can begin to understand. Your inability to understand a piece of information may well be the fault of the information and not you. The ways to reduce information anxiety are to learn how to. . .”

- find personal pathways to understanding
- lay claim to a feeling of *owning* information
- extract the full measure of meaning
- select the relevant from the superfluous
- transform data into information
- improve your powers of information reception
- find the appropriate organising principle for different subjects

• Travel anxiety?

Travel can most enjoyable, but can be stressful and produce anxiety.

Eagerness when journeying on holiday, worrying about arriving to a business meeting on time. The problem when using any form of transportation, be it public or private is having;

- **directional information**
- **distance information**
- **time information**
- **a hierarchy system for this information**

• **Information Requirements**

An idealistic style of transport information system would relate to people across all age barriers, culture barriers and ability/disability barriers, even though some of the requirements are varied. A readily available and understandable quantity of information which is self explanatory and relevant to each and every individual whatever the situation.

Unfortunately graphic designers have not reached this pinnacle yet but with each new and improved design solution this is becoming more of a reality. For now, as long as designers realise that transport signage has to have **a system**, **a value** and **a continuity** specialist designers will continually improve such systems.

• **Case Studies**

The redesign of the information design for the **London Underground** by *Henrion, Ludlow and Schmidt* is under way and is an on going project. The creation of a system of which principles for updating and possible changes have been accounted for in the design.

The London Underground has existed for many years and in that time the signage has changed much, not at definite times, but gradually (**Fig 2**). As Chris Ludlow said, at the Information Design Association seminar at Wolff Olins, "the movement of the underground sign design kept being redesigned 5% and 5% again and again until nothing appeared uniform".

Conveying the London Underground Information has been achieved in the past in a number of different ways, through signposts, mapping systems and leaflets. For example the London Underground has **directional information (Fig 3)**, which includes colour to differentiate between different lines. **Safety information (Fig 4)**, such as fire exits and 'way out' signs, being in the same form, physically, as the other directional signage but using other vehicles to be more prominent. **Leaflet information** incorporates the directional information in the form of a mapping system and consequently becomes a journey planning system.

However, for the international tourists **information centres** and kiosks are clearly available if the mapping and directional signage remain a daunting prospect.

Electronic information on the station platform indicates train *destination and* passenger *waiting time (Fig 5)*. These are a consistent design for all stations running as an interlinked system, with the intention of being clear, easily recognisable, maintainable and updateable.

Similarly at the **BAA Airports** there are a feast of information systems available for the user. A *directional system* adapted for each different airport, some designed in a more modern way others standing the test of time (*Fig 6*). However, black typography on bright yellow backgrounds throughout to allow an individual to plan their route through an airport and to give an awareness of location, if the architecture does not make it obvious. All the airports also have a loud speaker system and as with large railway terminals large electronic boards full of flight information have been designed to be individual and stand out yet be read easily and be convenient to update (*Fig 7.1 & 7.2*).

• **Information Breakdown and possible solutions**

The problems start when the system, the value and the continuity of a signage system breakdown or are interfered with. In both cases BAA airports and the London Underground are full of *advertising boards* producing information anxiety, the varying colours and typeface styles (**Fig 8**). Often these boards are very large dominating prime areas, which may be better served by signage.

In all cases of travel signage external elements can affect the way people react to and view the sign elements. A variation of shop and advertising signage, their size, shape and different colour variations. The architecture, and the lighting of the architecture may also affect the signage location and the way in which a person reacts to it (**Fig 9**).

Frank Pick, one of the first sign designers for the London Underground said that it is knowing how to react to a sign. Pick's Designs were refined and solid showing responsibility to the user and vision for the future, that is, not being *trendy, fashionable* or carelessly *shouting*. Henrion Ludlow and Schmidt when redesigning the Underground took Frank Pick as a standard to improve upon. A study of this type had not been attempted before due to its complexity. They studied the existing drawbacks in the signage system and defined a number of problems;

- lack of consistency in signing
- dated impression, the much earlier signs just looked decently old
- lack of flexibility in sign systems available
- lack of compatibility and co-ordination at the interface with sign systems for railways, airports etc...
- a lack of guidelines
- a degradation of the corporate identity
- internal frictions

From the results the important *directional information areas* were scrutinised. Directing passengers to platforms by either numbers or defined travel direction Surveys were carried out and results came out even. 50% said that direction (e.g. Northbound-Southbound Eastbound-Westbound) were a waste of time and 50% said that platform numbers were a waste of time, therefore both were considered in the design. (**Fig 10**)

Designing destination information also created some problems and opportunities. The London Underground has a number of different spur routes on most lines. The design problem here was how to define the separate routes on each line. One possible solution was to place the destinations on a matrix or grid, but on the existing system using *via* (**Fig 11**) (i.e. Morden via Bank) on the electronic destination signs and applying it to the mapping system was easier to retain and easier for passenger understanding.

Typography, always an important area, was under scrutiny. With new signage systems being produced in new railway stations, new airports and new

shopping centres, demand to retain the familiar typeface style Johnston but give *vision* to update and modernise. Since Johnston was produced to typeset manually it was under threat from computerset generated typefaces for choice of weight, ease and cheaper production. Typographic Issue 45 says "The Banks and Miles report, in conclusion, emphasized the extraordinary opportunity that existed with Johnston's typeface to pull together the whole system 'the lettering could act like a ribbon to tie up the disparate parts of the LT business into one well organised parcel'.

London Transport understood and asked for a demonstration of this idea. Banks and Miles then began a twelve year programming of redesigning Johnston's typeface and putting it into modern reproduction systems." (Fig 12)

There remained a choice whether to use Upper Case or Upper and Lower Case. A study was taken and people reacted more favourably to Upper and Lower case saying that, compared with Upper case, it was more unusual, more friendly, more modern and more appealing. Upper case alone was more authoritarian. It was retained for the main underground corporate signs and all station signs.

Each station has a range of letters which fit into a space limit, therefore a range of type sizes were used. **Safety information** should combine with the other information and signage but retain that individual quality. This is true of the **way out** and **Emergency Exit** signs (Fig 13). Unique in colour from the other signage the 'way out' sign was considered for change to 'Exit', or a possibility of others. However, Henrion Ludlow and Schmidt believed that the 'way out' sign was an important integral feature, more international and more understandable.

Jock Kinneir designed and implemented the **BAA airport** black type on the yellow background in the 1970's. This has remained the standard to the present. The physical forms may vary in each airport due to architecture and passenger flow but the underlying typographic principle remains the same.

Helsinki Airport in Finland also took up a similar system with black and yellow. However, a single internationally recognisable styled sign system would be difficult to uphold because of the differences in cultural connotations and airport architecture. Indeed BAA itself has extreme difficulties designing in different terminals. Sometimes it can be difficult to compliment such buildings. Jock Kinneir once said "I am tired of providing crutches for sick architecture. Signs should be beacons".

Directional Signage will always have to compete with architecture, advertising signage and retail signage in an airport environment. Interference with the sign system, be it from retail stores or from other signage, may induce **sign blindness** (Fig 14). There may be too many signs and the individual may not receive the required message.

Passengers were also found to have a problem with *arrowitus (Fig 15)*, too many arrows telling the same story. Since direct relationship with text was important and the design was to remain functional, a suggestion to group messages with one arrow was considered and implemented (*Fig 16*). Gravity of bad text, pulling the eye downward visually, was not common, but in evaluation running text remained favourable.

- **The Future**

With the advance in information technology and computer design, new information is required and access to that information is becoming more easily available. This has been noticeable with the introduction of *interactive self help points*. Interactive touch screen information systems have been installed in a number of BAA airports. Some of the older designs from approximately five years ago were not planned for update. Many have been withdrawn or remain dormant through lack of use and difficulty.

The system installed at Gatwick airport one and a half years ago was well designed, easy to use and remains in use today by the information desk (*Fig 17*). Another success with this is the auditing of the system to find what buttons are pressed, how often and at what times during the day to gain feedback from passengers. The system gives *directional information (Fig 18)*, shows the kinds of *airport facilities, assistance* and most used *flight information (Fig 19)*. The flight information is directly linked with the main flight board but has updating problems.

With computer capacity growing fast Gatwick design management are updating their whole flight information system. They are therefore contemplating updating the touch screen system.

As long as *touch screen information systems* have the required information, are easy to access and are well designed the technology will come. With the correct maintenance care and updating, such information systems will be as popular as *ATM bank cash machines (Fig 20)*.

Whether information and sign design be for airports, London Transport, shopping centres or road transport, the arrangement is required to be *calm, simple* and *functional*. Chris Ludlow indicates that priorities of message be it *directional information, distance information* or *time information* should be portrayed in a logical hierarchy. With Schipol Airport in Amsterdam the underlying design principle has allowed sign system update and variation much easier (*Fig 21*).

Henrion, Ludlow and Schmidt have designed the new information for the London Underground in such a way to set principles to stand for the future. If

the careful improvement of information design and signage design remains steady, the appropriate information is conveyed and principles continue to progress, the chances of reducing information anxiety in travel will become a more realistic possibility for the future.

Developing a Multimedia Project

The idea

Every good project starts with a good idea. There has to be some purpose or goal before starting work on a project.

Establishing the constraints

Whether the project is developed individually, for a company or a client there will be a number of creative factors and restrictive factors that will affect the final result. Then there are the standard obvious constraints, such as cost, timescale and materials to be used.

The not so obvious constraints

Who is the product targeted at?-

Few products are for everyone. For example, an exhibit at a museum or an electronic sales brochure will probably be used by a different audience than an electronic help system. Each group of users has different needs and expectations.

Who will it be used on?

The types of hardware and software are appropriate to different situations and audiences. This will probably increase the costs because of the time experimenting with multiple graphics packages. Then there is the problem of how much memory is required, whether it be in colour or black and white, the screen size, the software system to be used and of course how the product will be delivered.

Unique constraints

Development- the authoring, the data and the resource availability.

Production- the updating facility, the implementation, including the designing and building, and instructions for use.

Distribution- How much material needs to be moved to make it a viable product.

Planning the production

The authoring *environment* affects the look and function of the final production. The idea to look at existing products and plan around certain interesting concepts is one preferred avenue.

The *data* is the heart of the production. It is the information that is being conveyed to the user.

The task can be difficult when presented with a new project and having to design a new *interface* for it. There are two kinds of elements in user interface design. *Structural*- which includes elements such as menus, data fields,

windows, buttons and grids. These elements must be defined early in a project. *Cosmetic*- which include items such as background graphics and the shape of icons. They are elements usually easy to change and can be varied towards the final design of the project.

NOTE: One of the problems with multimedia is that it is a very superficial medium and although the structural elements are the most important, too much time can be spent worrying about the cosmetics. The secret is controlling the time between the two.

Getting started

Research! Why spend months re-inventing the wheel, all that is required is to examine existing projects that are similar. The idea is to take the best and most useful elements and to apply them.

Creating the prototype

Working in segments appears to be the best way to work. First the implementation of the structure then the design of the fields, menus and most of the buttons. (It makes no sense designing the graphics before the structure is complete). Secondly is to implement specific functions, to choose functions that can be tested independently of the remaining project areas. Then finally to test the design on the user and then add or change required elements depending on the test results.

Testing and adjusting the prototype

Getting the best input possible it is better to try the product on someone who has never seen it before, and more importantly not to give any hints, just to watch and see where the problems appear. A number of questions should be asked during the test and after the test, the main questions being;

- *Do they know how to find things?*
- *Can they use the index?*
- *Do they seem to find everything in the system?*

..and then to keep track or a list of all changing items.

- *Keep a list of things to be fixed*
- *Keep a list of all things that are done in the project?*

Further improvements and development

Once the system is up and working here is a distinct possibility of a problem or bug to iron out. In relation to this there is also the possibility of being able to look for future projects and updating as and when required when new demands are made.

Much of the information above has been taken from *Macintosh Multimedia Workshop* (Murie 1993).

Perex Touchmate

The touchmate is a sensing platform, similar looking to a set of bathroom scales, which converts any monitor placed upon it into a touch monitor.

Tourist Information possibilities

A selection of possible contents in which an interactive system could prove invaluable to a traveller. Some European tourist information would be very useful whatever the direction of travel.

For beyond the Channel Tunnel travel

- Getting to a destination after channel tunnel travel + **contents**
- Red Tape and Visas – customs
- Maps
- Information Centres and Tourist Centres
- Health and Insurance
- Police and trouble
- Rules of the road
- Money and Banks
- Communications -Post offices and telephone
- Business hours and public holidays

After Arrival in Destination

- Introduction + **contents**
- Spoken Languages
- Getting around -maps and public conveniences
- Sleeping
- Costs, money and banks
- Communications -Post offices and telephones
- EMERGENCIES
- Food and Drink -tipping
- Museums, churches, castles and war cemeteries
- Festivals and annual events

- Other possible directories
 - Bike Hire
 - Car hire
 - Contraceptives
 - Disabled Facilities
 - Electric Current
 - Left or lost Luggage
 - Lighting up times
 - Shopping times
 - Time Changes and time differences
 - Travel Agents
 - Weather

 - *Return train information*

*Many of the above ideas were considered after consulting the **Rough Guide** tourist information books (Dunford M, Holland J, Lee P 1990).*

Learning the Lingo

An interactive language learning programme

Galleria 21 Interactive shopping system

RNIB Challenging Blindness

*'Improving signs and displays for blind and partially sighted travellers'
A section from the conference proceedings from 9th December 1993*

*A passenger information strategy
by Neil Anderson, Strategic Manager, JLE London Underground*

MINTEL Report (1993)

Channel Tunnel Marketing Information

The Channel Tunnel will have to contend with two sets of factors that will determine its level of success. Firstly those factors that will affect the whole of the travel trade and secondly, factors which are specific to the market for the tunnel.

The recession – the effects or fears of unemployment. This has led to late booking and short break holiday trends.

The evaluation of sterling – this influences the market in terms of destination, and best value.

A network of high-speed train services – from London to Paris and Brussels and routes beyond are being planned and developed.

Deregulation of the European airline industry – cheaper European air fares could impact on the success of Eurostar.

Changes in the population profile – there will be more family groups with school-age children and older over 45s in the holiday market.

Growing amount of leisure time – The increase in leisure time has resulted in the trend for multi-holiday taking. An increase in the taking of short breaks could have a positive influence on Le Shuttle sales.

A growing trend to more independent travel – as people want to branch out and have *tailormade trips* to suit their individual needs. Again, this could become an important factor in the success of the Channel Tunnel services.

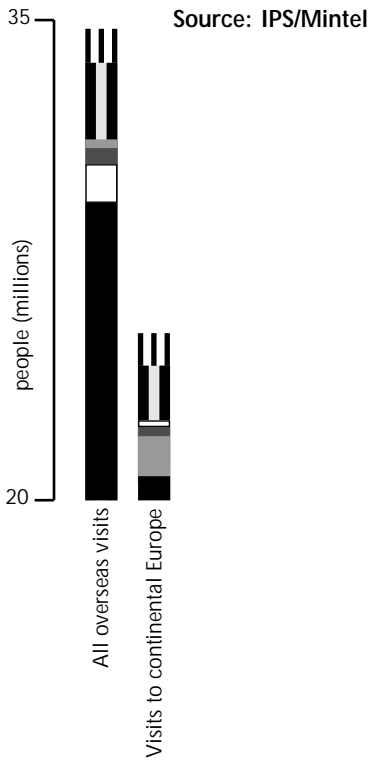
Political and social developments – The Channel Tunnel creates a terrorist threat, yet most forms of transport can be vulnerable to terrorism.

UK transport links – There are plans to widen the M2, London to Dover motorway to four lanes each way. If holidaymakers fear holdups or delays before actually reaching the terminal, they may be put off.

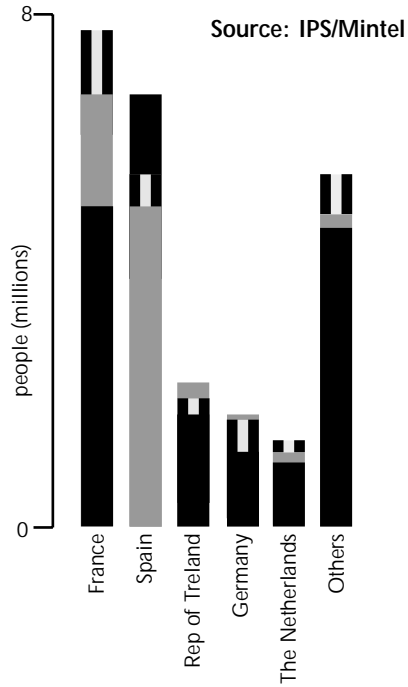
Price – The potential appeal to customers, which will be speed and frequency, remain to be tested. Ferry operators have vowed to fight back with a price war and long term strategies based on comfort and shopping.

European Holiday Destinations – holidaying on the continent may be becoming too routine and in danger of losing its novelty values. Long haul holidays may benefit from this. On the other hand, the opening of more European leisure centres and parks, such as Euro-Disney, may encourage more popping over to the continent.

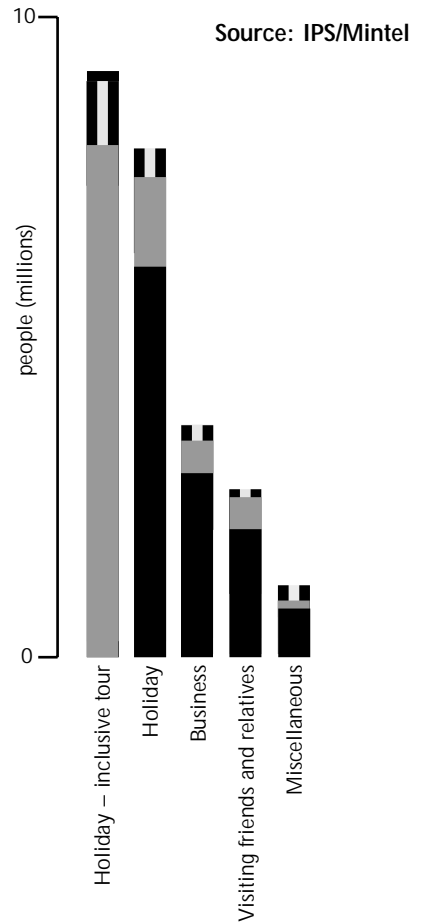
Visits to the continental Europe as a proportion of total visits overseas by UK residents 1988-1993



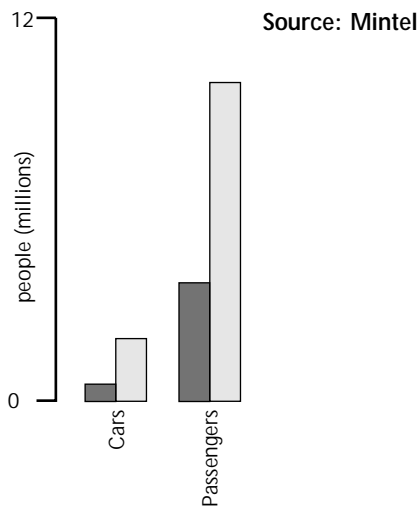
Leading destinations of UK residents within continental Europe, 1988-1992



Main purpose of visit by UK residents to continental Europe, 1988-1992



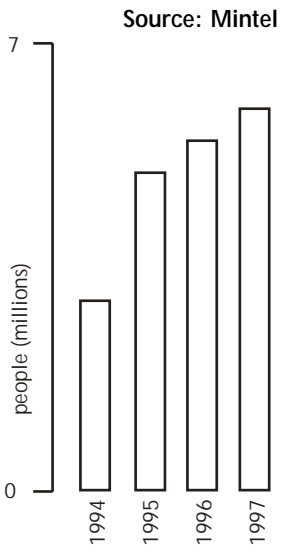
Estimated number of passengers and cars using Le Shuttle, 1994-1996



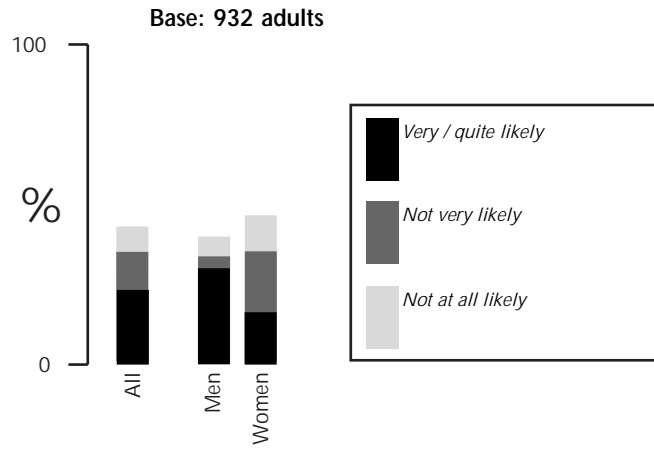
Information relating to graphs on this page



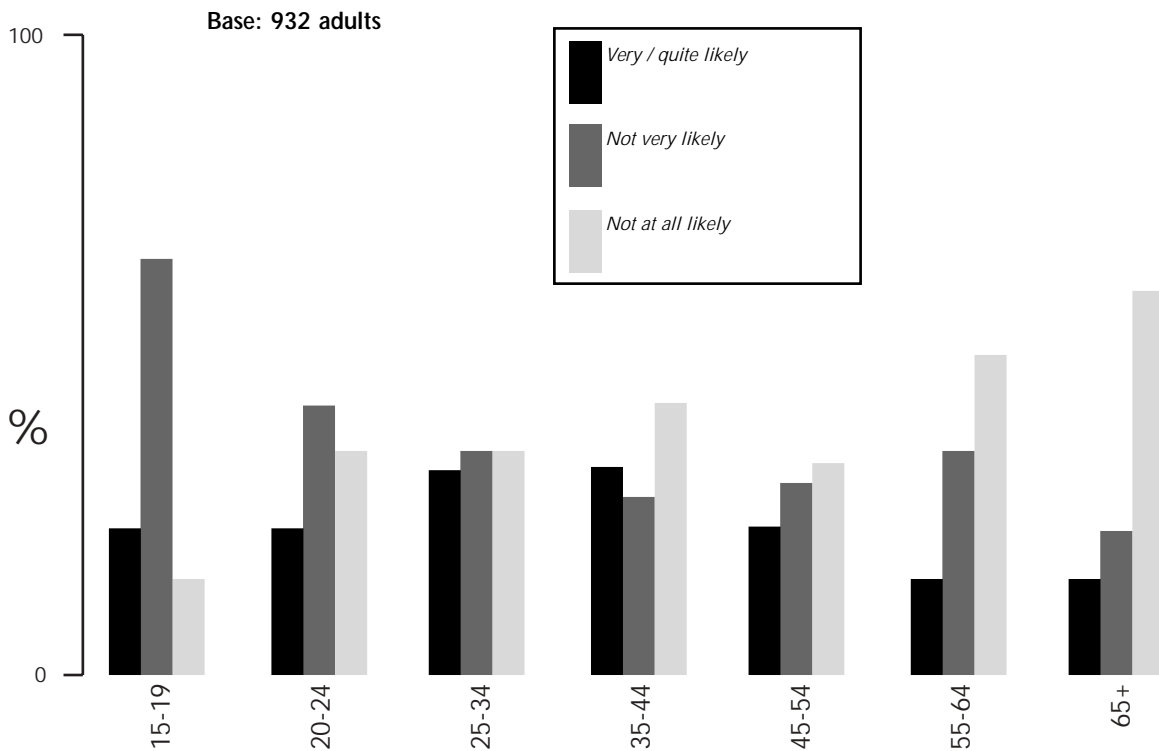
Estimated Eurostar services by volume,
1994-1997



Likelihood of using the Channel Tunnel
by gender



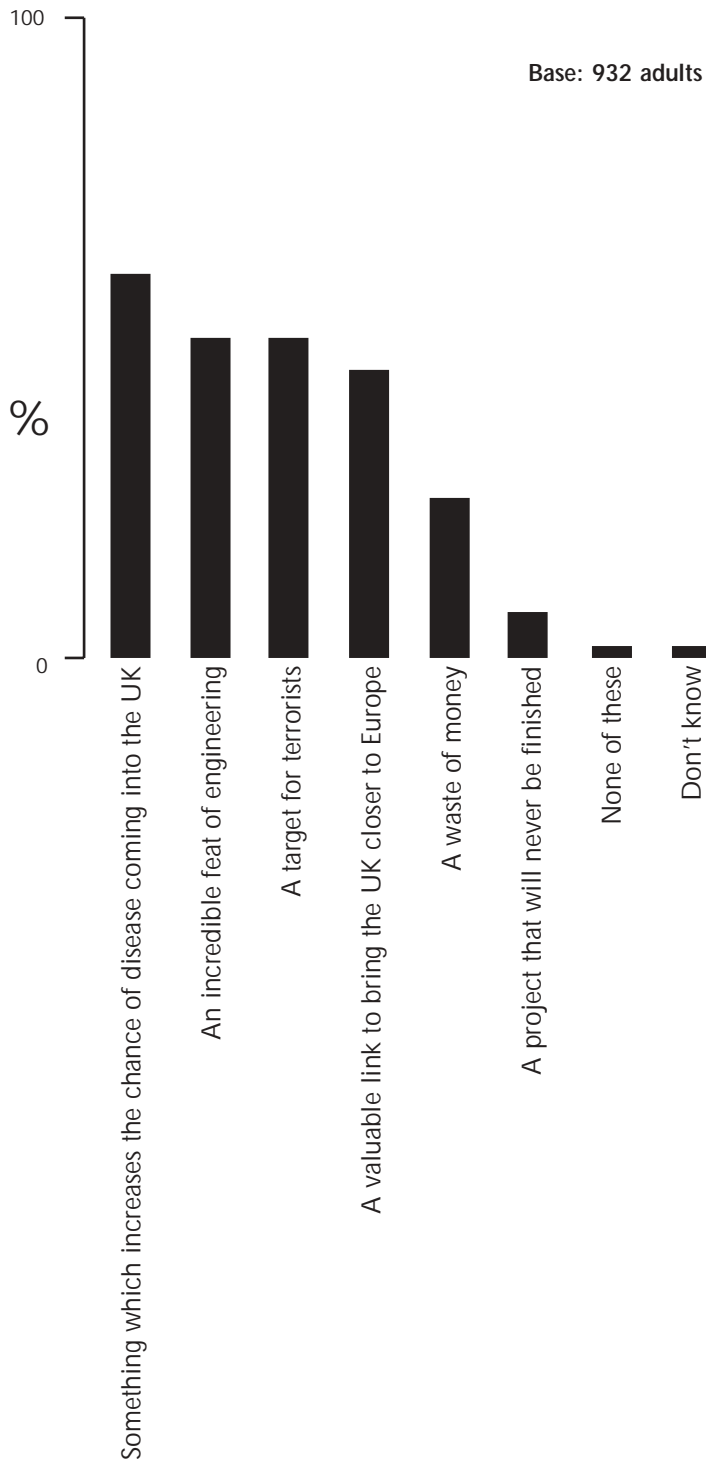
Likelihood of using the Channel Tunnel
by age group



Consumers were asked:

“Still thinking about using the Channel Tunnel, which of these statements do you agree with? You may choose as many or as few as you like”

Consumer perceptions of the Channel Tunnel



Design Approach Flowchart

A possible approach to a design problem, or opportunity