

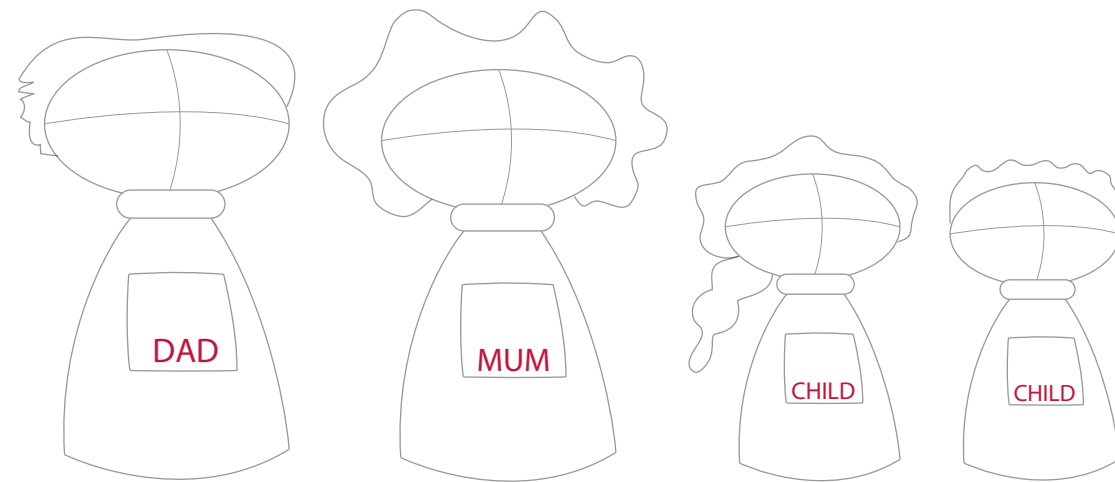


New Concepts to Support Working Parents in the Car

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car, mobile, design,
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concepts

Working parents are an interesting segment of the population because they have heavy demands in both home and work spheres. In an initial, in-depth study, we discovered many different strategies that working parents employ to help them cope with work and family demands whether they are at work, at home or mobile. Following on from this first study, the validity and extent of car-related stresses for a larger sample of working parents was confirmed in a follow-up questionnaire involving 715 people in both the US and the UK. Here, we found many of the most severe everyday problems for working parents were related either specifically to being in the car, or were more general problems exacerbated by being mobile. On the basis of this finding, we conducted a follow-up workshop with six working parents to discuss car-related issues in more detail. The result is this catalogue of design ideas showing some of the initial concepts we have developed to help working parents cope with these and other stresses and strains of everyday life.



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Working Parents in the Car
Sept 03 - Jan 04

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Working parents are an interesting segment of the population because they have heavy demands in both home and work spheres. In an initial, in-depth study, [Beech et al., 2003] we discovered many different strategies that working parents employ to help them cope with work and family demands whether they are at work, at home or mobile. This research also highlighted working parents' heavy dependency on the car as a kind of "mobile habitat" in which work and home demands are dealt with. More particularly, we found that the car is the context within which the transition both geographically and mentally between work and home life is managed. Because of this, working parents spoke of a number of particular stresses associated with car travel.

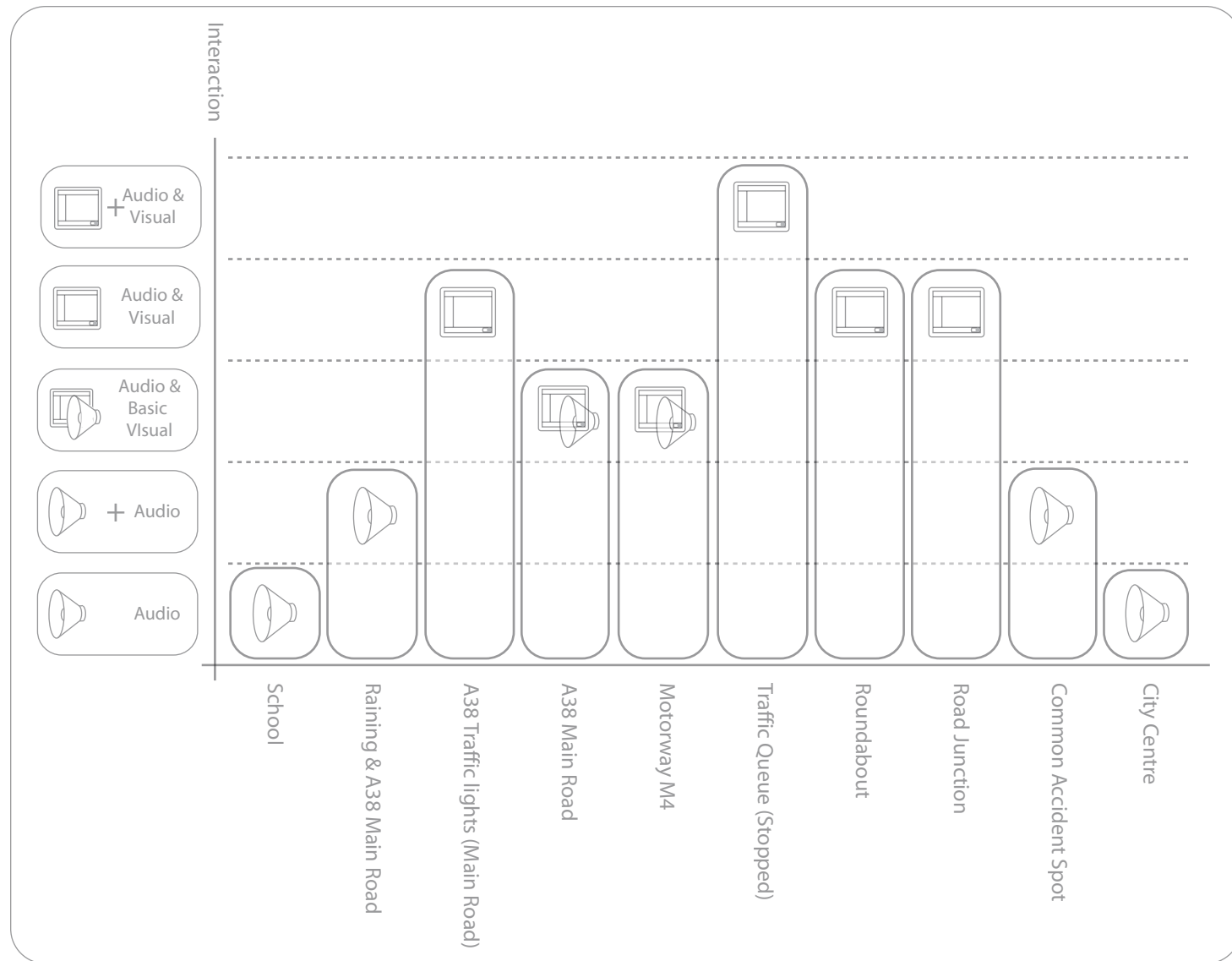
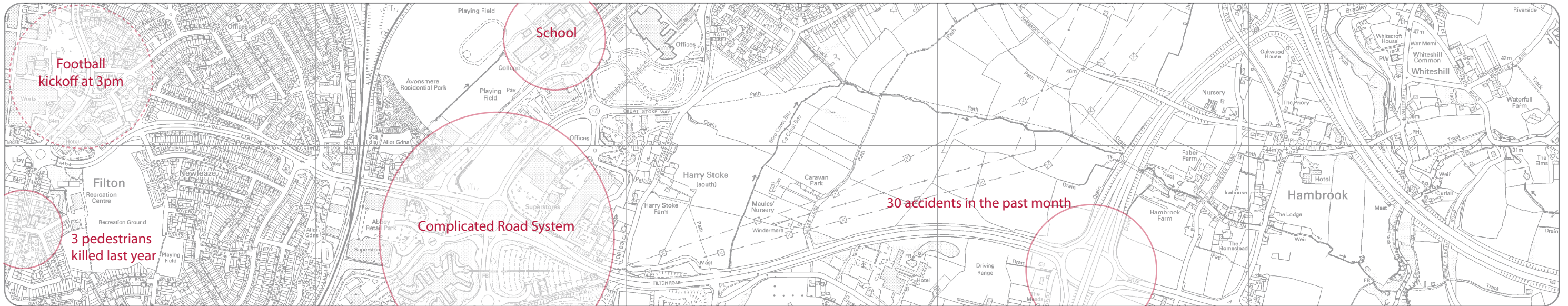
Following on from this first study, the validity and extent of car-related stresses for a larger sample of working parents was confirmed in a follow-up questionnaire involving 715 people in both the US and the UK [Sellen et al., 2004]. Here, we found many of the most severe everyday problems for working parents were related either specifically to being in the car, or were more general problems exacerbated by being mobile. On the basis of this finding, we conducted a follow-up workshop with six working parents to discuss car-related issues in more detail. Among the issues that most concerned them were:

- The stresses of having to drop off or pick up children on time due to the uncertainties of traffic and unexpected demands from home or work.
- Stresses surrounding remembering objects and items for school and work that must be taken in the car or transferred between cars.
- The difficulty of taking care of work activities (e.g., time management and communications) while in the car.
- The difficulty of communicating with family and managing and coordinating family life while driving.
- The difficulty of entertaining children, especially younger ones, on longer journeys.

This catalogue of design ideas shows some of the initial concepts we have developed to help working parents cope with these and other stresses and strains of everyday life.

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Context-based Control of Level of Interaction



Level 1 Interaction

Mobile Phone (Hands Free Audio Interaction)
Digital Car Stereo (DAB, USB Expansion Slot, MP3)
Heating / Air Conditioning (interaction)
Traffic Navigation (Simple Audio Navigation)

Level 5 Interaction

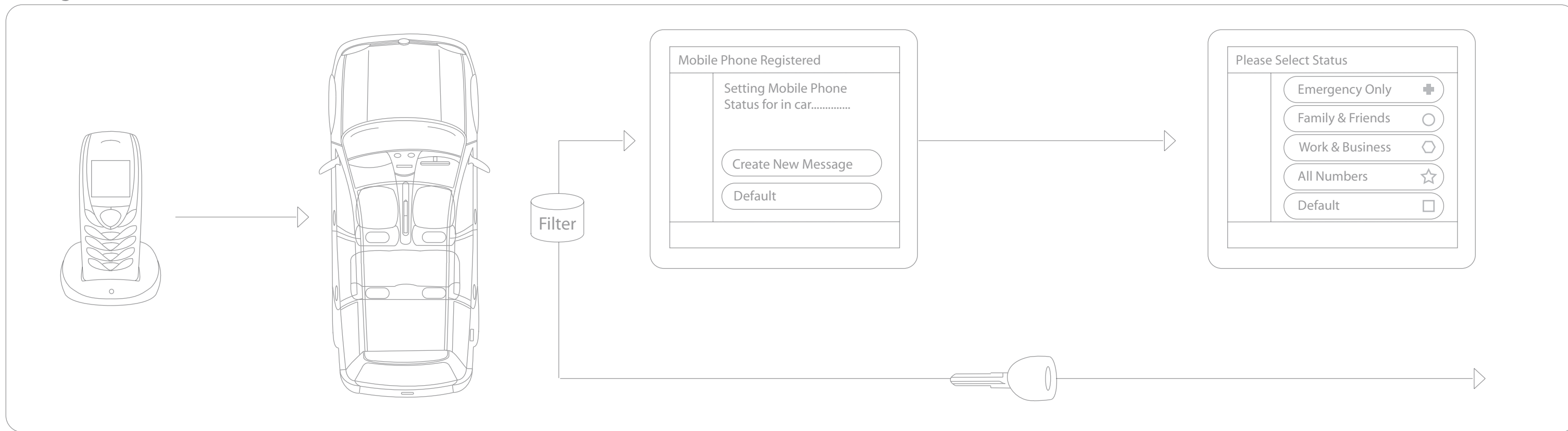
Email Headers (Visual or Audio)
Home Computer Access
IP video conferencing
Traffic Navigation (Map & Webcam)

With increasing numbers of applications being developed for the car, there is a danger that drivers will be inundated with too much audio and visual information, distracting them from the primary task of safe driving. This concept uses information about external context to limit the level and type of interaction possible within the car.

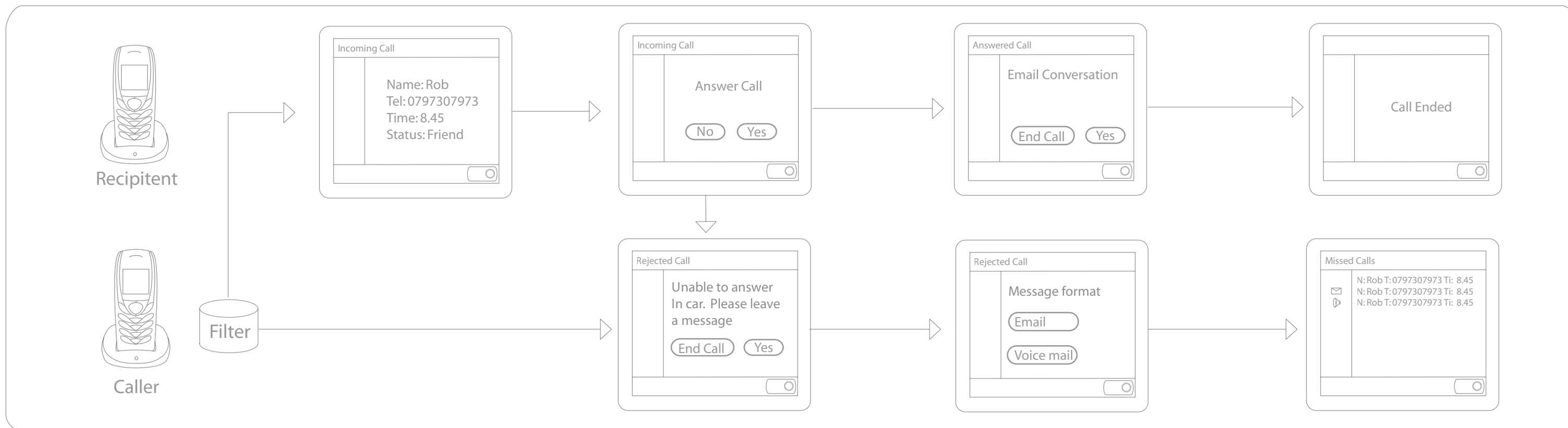
This concept works by combining various kinds of information about physical conditions with information specific to location and time from wireless connection to a digital database. Physical conditions might include: road conditions, road type, traffic volume, speed of the car and weather conditions. Information from the database might include data about whether one is in a school zone, accident black spot, or nearing a complicated junction, and whether there are local events taking place such as football matches.

This contextual information is intelligently combined to restrict interaction within the car, for example by choosing from one of five levels of interaction possible, ranging from audio-only information all the way up to full audio-visual interaction with in-car systems. This then supports drivers by helping them focus more fully on the driving task by filtering out and making unavailable surplus, distracting information.

Intelligent Use of the Mobile Phone in the Car

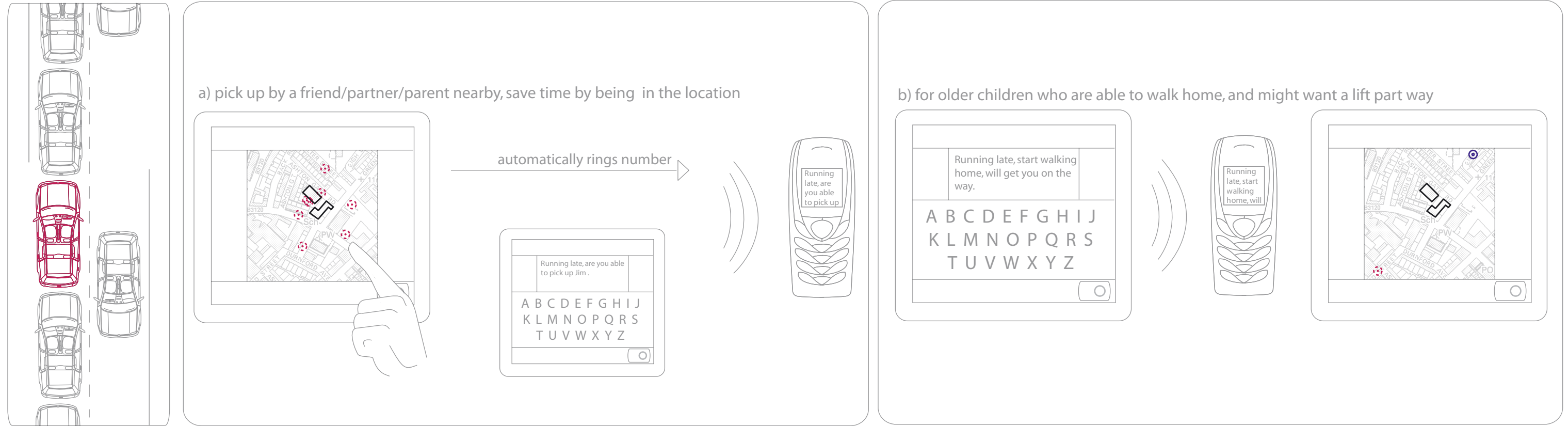


Answering the mobile phone when attached to the car internal network

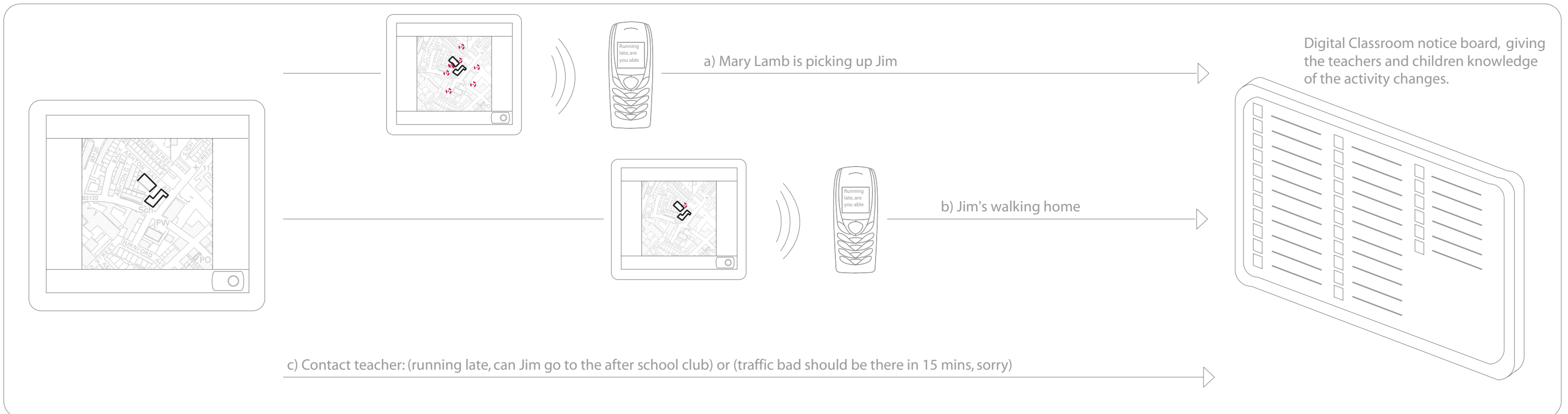


Working parents need and want to be in touch with family and with work colleagues while in the car, but they want more flexibility over how this is done both for safety reasons, and so they can control their availability to others. In this concept, the hands-free set connects to an in-car system which allows drivers to select their availability level depending on whether they wish to be in touch with work only, home only, everyone, or only for emergencies. It also offers them a choice of how to deal with calls, for example by allowing the option of recording calls or translating the voice to text and emailing the conversation to themselves. In turn, the mobile phone "knows" it is in the car, and lets callers know this fact, offering them a choice of various ways of leaving a message.

System to Support School Pick-up of Children by Trusted Adults

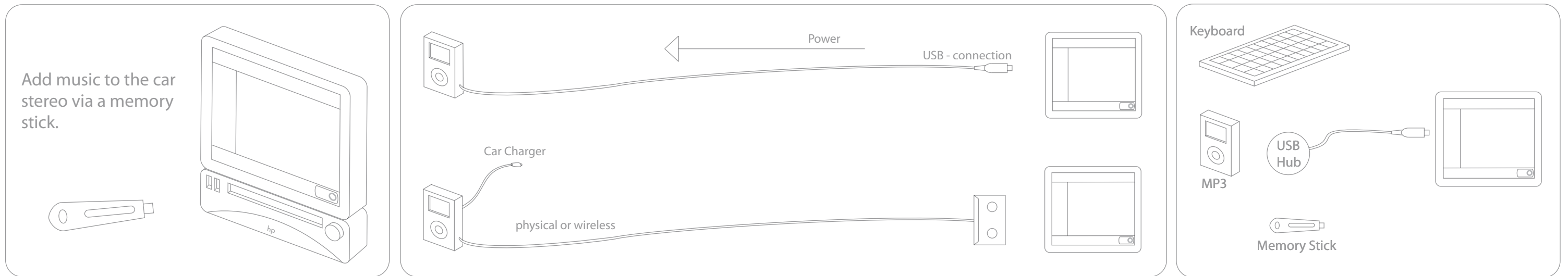


Answering the mobile phone when attached to the car internal network



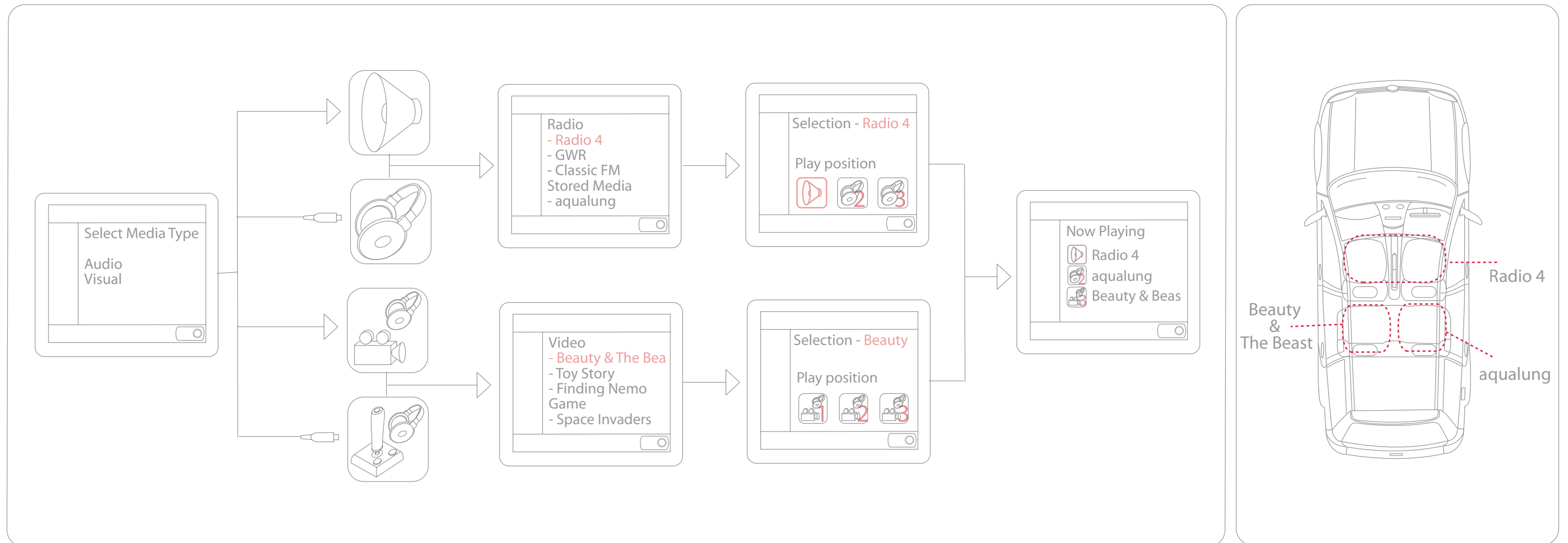
One stressful problem for working parents is the difficulty of picking up children from school due to the uncertainties of work demands and traffic. This concept proposes a mobile in-car system that allows parents to make safe, alternative arrangements until they arrive. It does this by allowing them to see which trusted adults are in the vicinity of their child's school so that they can be quickly contacted on their mobile phones to request pick-up of their child. (Parents invite other adults they know in advance to sign up as part of their trusted network.) At the same time, a message is sent to the school about the new arrangements, which may be displayed, for example, on a digital noticeboard at the school. A version of this for older children with mobile phones might involve sending them a message to begin walking home. The parent can then track their progress and pick them up

HUB connection for USB products



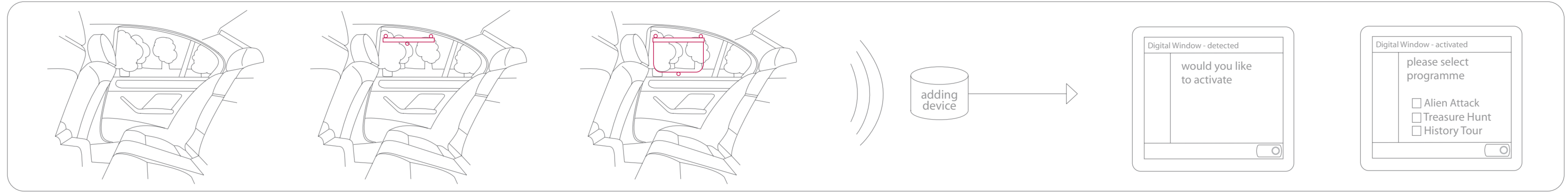
This concept shows a method of creating easy access for USB devices in the car. It allows working parents to carry the newest stories or videos on a portable device such as a memory stick. By simply plugging it in, the files can be loaded into the in-car entertainment system, thus keeping the car system up to date with digital media. This system would also allow for the integration of portable devices such as MP3 players, printers, joysticks and keyboards as well as allowing the USB devices to be powered and charged.

Parental Control for In-car entertainment.

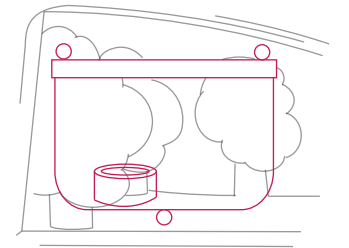
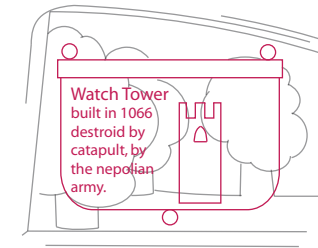
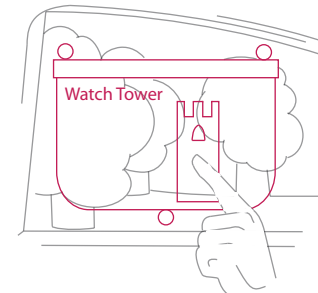
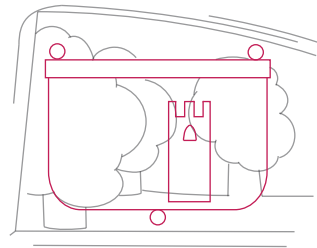
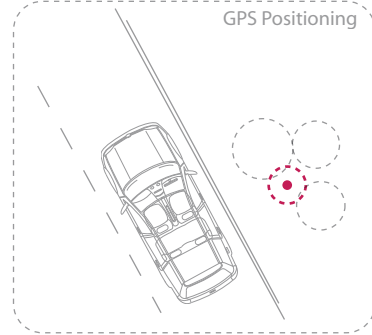
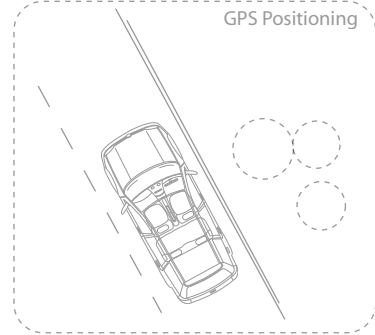


This concept allows the working parent to control and maintain awareness of in-car media viewed or listened to by the children. The parent can select the media type (music, video, or computer game) choose the album or movie and specify where the media can be accessed. This method helps deal with the problem of the parent having to help their younger children change tapes or cds.

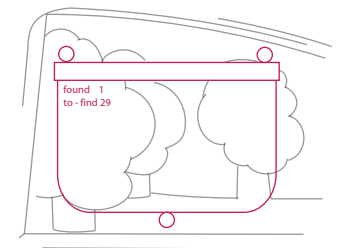
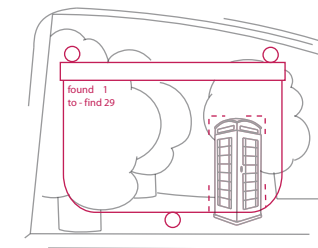
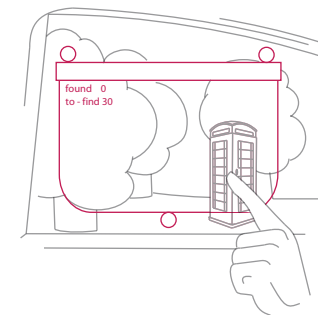
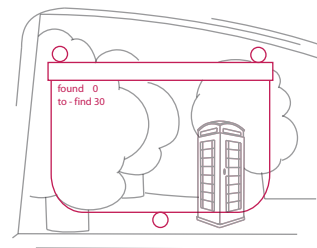
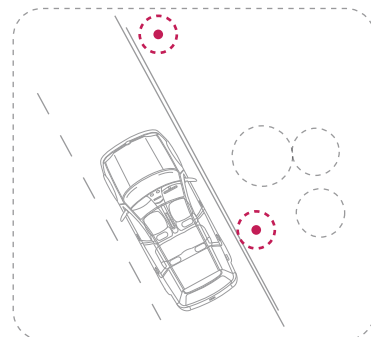
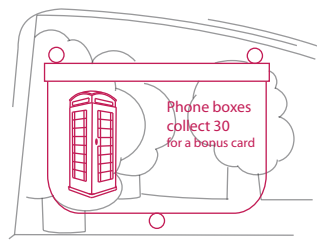
Digital Window for In-Car Entertainment



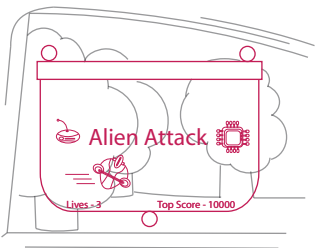
History Tour



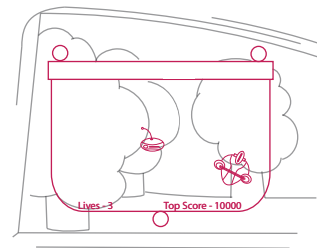
Treasure Hunt



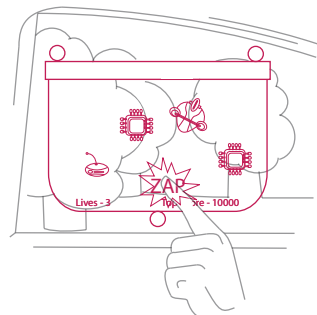
Alien Attack



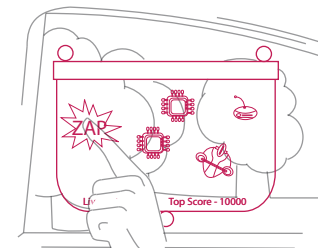
Speed 30 miles



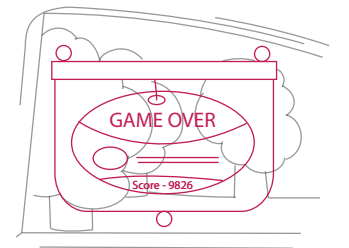
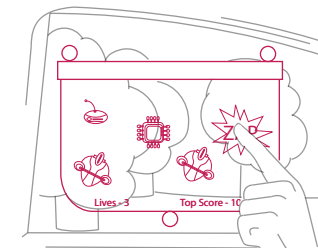
Speed 35 miles



Speed 40 miles



Speed 30 miles



Entertaining both younger and older children in the car can be a problem on long journeys. The digital window emulates a roll-up car sunscreen allowing passengers to play games through touch input. Through the use of a semi-transparent e-paper screen, and using camera input capturing scenes outside the car, this concept makes possible a whole new realm of games that incorporate features of the external environment. These include:

" A treasure hunt game where children must find and collect objects during a car journey. As they come into view, the child touches the object on the screen and points are awarded and displayed. Objects could also transform themselves into other graphical objects on screen (such as characters) when they are touched.

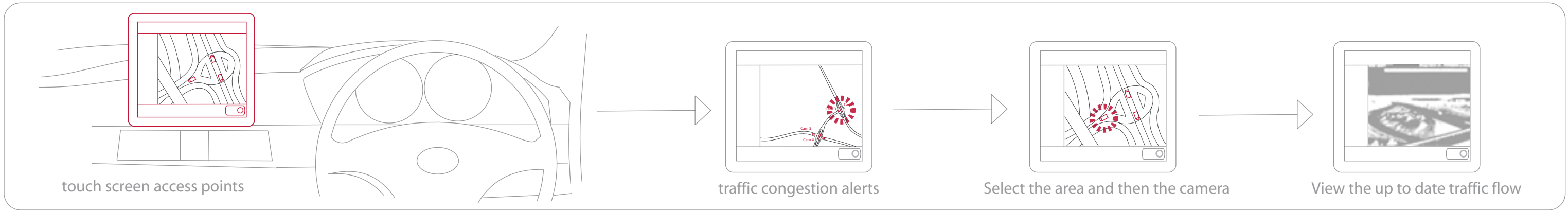
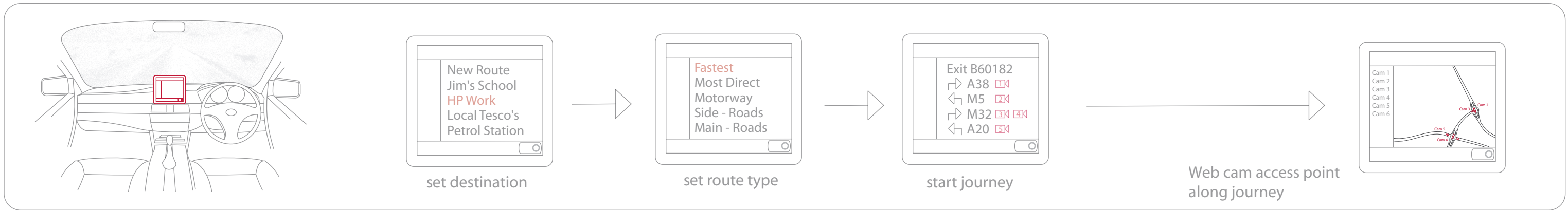
" Using features of the real world such as the speed of the car, characters within a game could take on different powers, or make possible different actions such as in an alien attack game.

" Colours of things in the environment could be used in a simple "finger painting" art program, whereby children have to collect and capture colours (and maybe even textures) to add to their palletes in order to create pictures.

" When combined with wireless network technology, extensions of this idea could include educational, context-aware games. For example, a history-based game could give historical information about local objects and landscapes viewed through the display window.

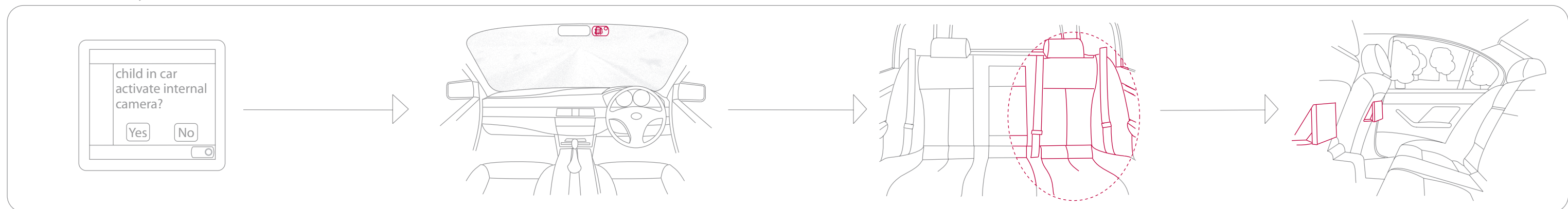
There may be additional advantages to such a system in terms of encouraging children to look out of and through the car windows rather than at small screens within the car. This may be better in terms of preventing car sickness, for example.

Web Cam Route Planner



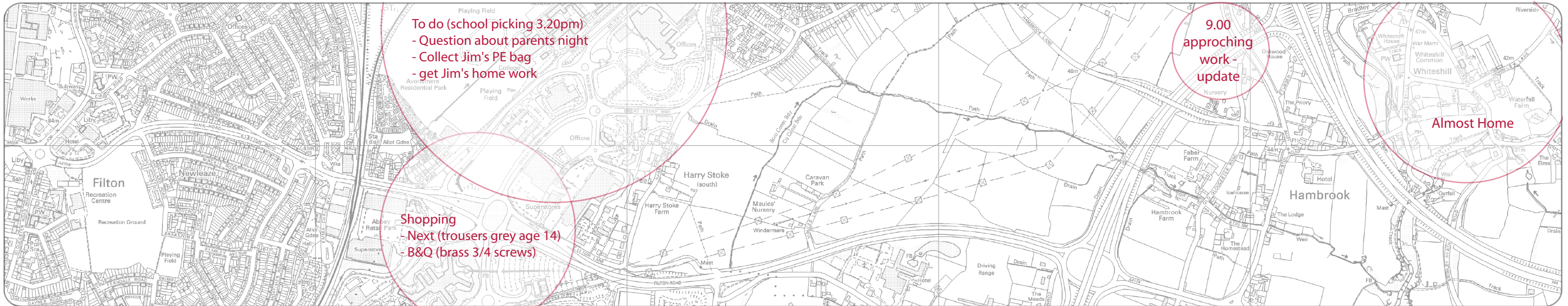
A major problem for working parents is traffic congestion on the daily commute to and from work. This system proposes making use of strategically placed Web cameras in order to view in advance the traffic conditions at key junctions. Views can be quickly accessed and scrolled through on a small display in the car because the system has stored the routes for the most frequently travelled journeys. Glancing at the display allows the driver to quickly make a decision to take a different route if necessary. Alternatively, for new routes, the system can help in planning the best way allowing drivers to plan the route based on assessing the traffic at key junctions.

Back-Seat Baby Cam



An idea for a simple camera and screen system to keep an eye on the baby in the back seat. An advantage of using cameras and displays rather than mirrors is that an additional camera attached to the driver's display can capture and display the parent's image to the baby over the in-car entertainment display mounted on the back seat.

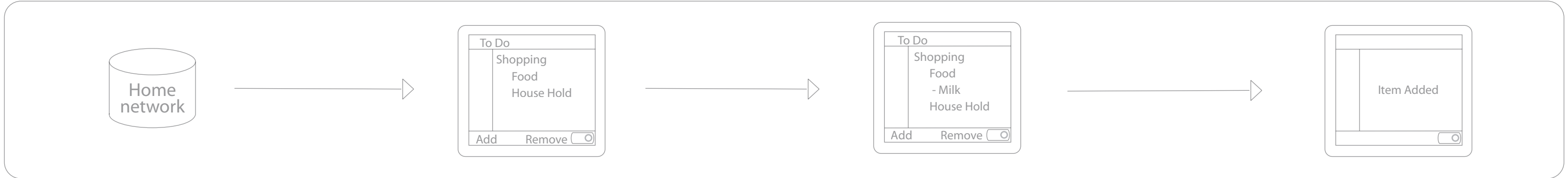
Hotspot Personal Reminding System



Creating to do list

Triggered at the Supermarket

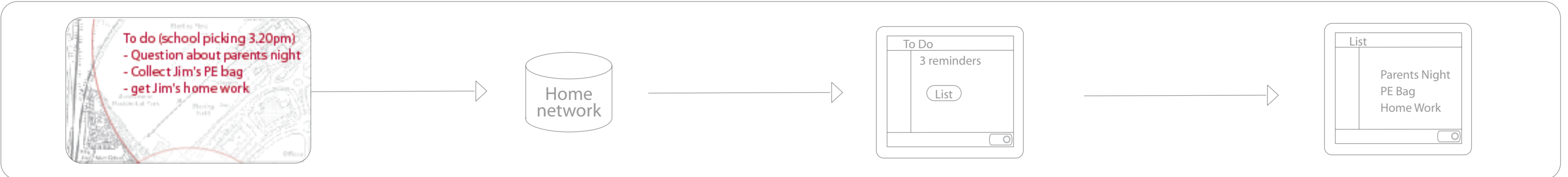
Audio + Visual



School PickUp

Triggered at Jim's School

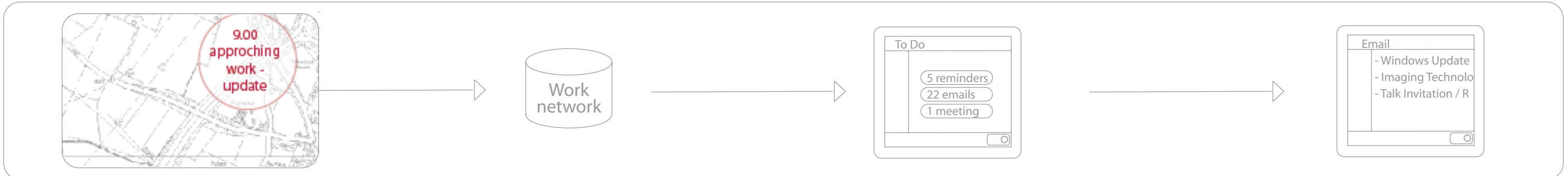
Audio + Visual



On Way to Work

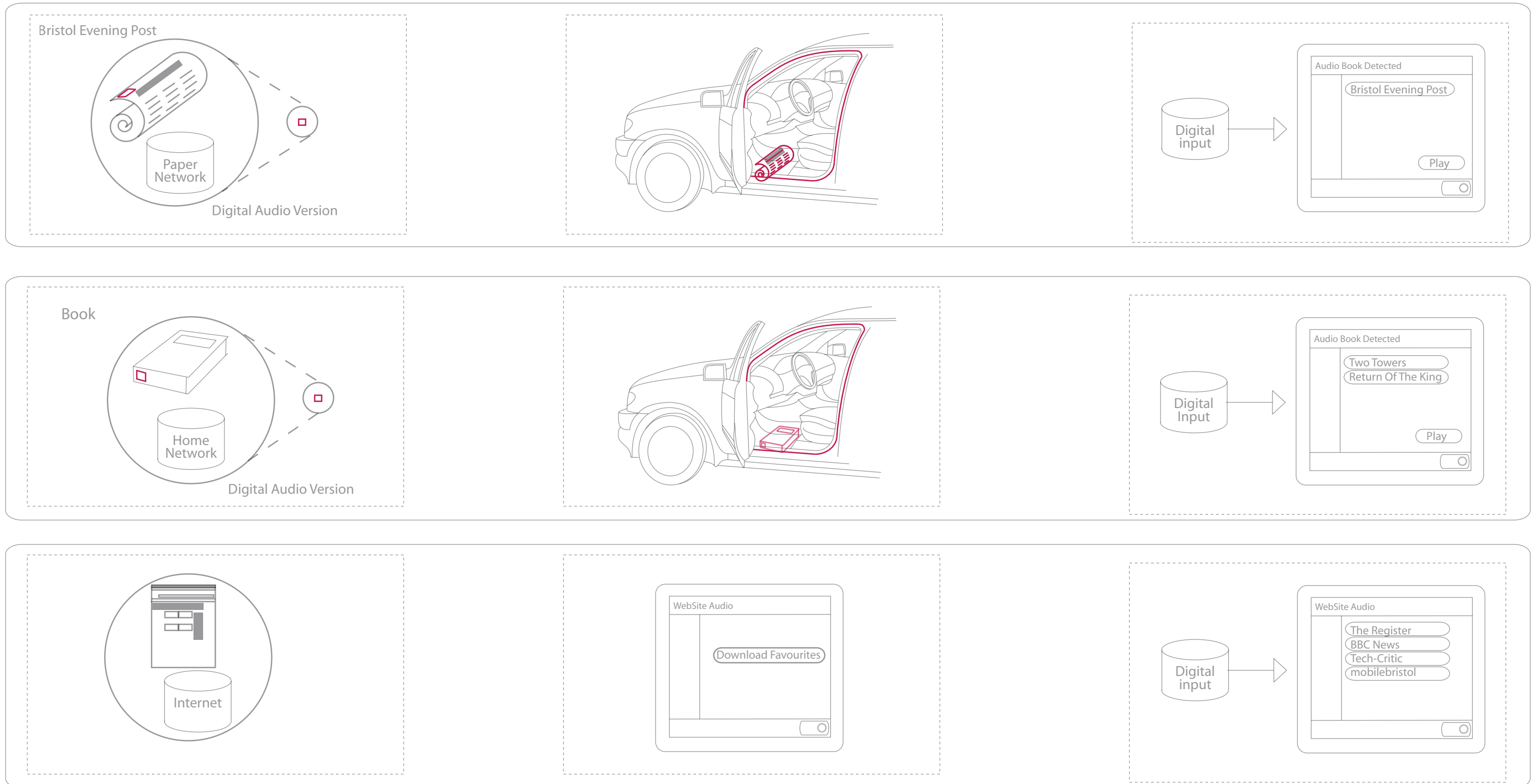
Triggered 1 mile from work

Audio + Visual



This concept uses hotspot wireless network technology to deliver personal reminders into the car based on location. Working parents can create home-oriented ToDo lists (including shopping lists, or reminders related to the children) or work-oriented ToDo lists (such as tasks which need completing or upcoming appointments) which are stored either on a home or work database. These are triggered at appropriate places or when approaching key "landmarks" (such as the home, school or work) when in the car. The reminders can be delivered either visually or using speech-to-text technology.

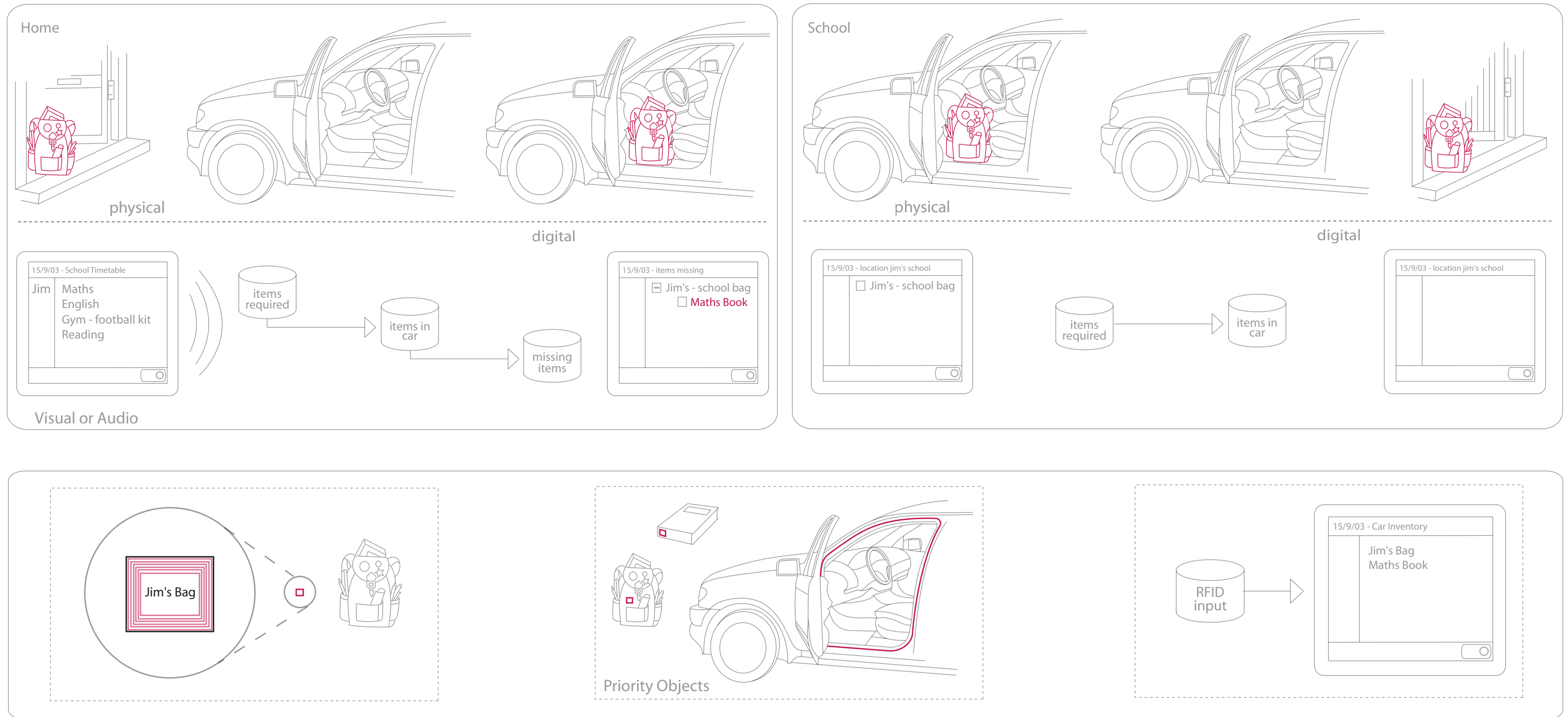
Paper-Based Audio for the Car



This concept describes a way for working parents to enjoy paper-based reading materials in the car to make better use of this time either for entertainment, information or education purposes. The system we propose requires that books and magazines are tagged with electronic identifiers such as RFID tags which uniquely identify the existing audio files associated with the paper publications. When the book, newspaper or magazine is put in the car, and in-car RFID tag reader reads the tag and sends the identifier to a database which calls up the associated audio file. This could happen in various ways. For example, it could make use of a 3G telephone connection whereby audio is uploaded from the internet to the car and streamed into the car. Another possibility is that homes have internet-connected servers. The car might upload and cache materials via Bluetooth from the car to the home server overnight while parked near the house. These materials are then available for journeys the next day.

Furthermore, one can imagine a voice-input system for the audio which allows drivers to quickly browse in a hands-free way to where they left off in paper-based publication. For example, they might say "Chapter 10" to get to the beginning of the chapter where they left off, or say the page number. If the publication is a newspaper, they may want to "skim headlines" or "read the sports section", all activated by speech.

In-Car Inventory System



A significant problem for working parents is remembering all the items that they and their children need to take with them in the morning during term time. This concept proposes a system of RFID tags used in conjunction with an in-car inventory system. By tagging key objects (such as book bags, PE kit, books, keys, and wallets) a sensor in the car can detect and list all the objects that enter the car so that the parent can check all the necessary items are on board before leaving the house. A simple version of this would list the items on board and display them on a small screen inside the car. A more advanced version would be used in conjunction with an in-house database which would compare the items in the car with details of the family calendar which keeps track of which events take place at school and work on which day of the week. The list for the day could simply be displayed for the parent to mentally check what was needed, or it could be compared against the inventory of tagged items in the car and highlight missing items. Such a system could also be used to track missing items by establishing where they were last "seen".

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