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Joan Zalacain

“There will come a point when essential and trustworthy information for drivers will be transferred from roads to cars”

Joan Zalacain is a designer with ten years' experience in maps, way-finding and graphic design. He likes to bring clarity to what some call our era of information obesity. His design approach aims to improve user experience by simplifying processes and delivering information in an effective and seamless manner. His clients include Mijksenaar Wayfinding in Amsterdam, where he worked until last year. Deciding to broaden his knowledge, he enrolled on a master's degree in Information Design at the University of Reading.

How New Technologies Could Change Road Signage in the Future

Reliance on new technologies for road transport is increasing, both on the road and in the car. While some may still need to be perfected, several current devices are presented to show how they can clearly be of help to drivers. The influence of new technologies on road signage is also examined, in the light of a hypothesis that illustrates how road signs could evolve if designers took such technologies as their starting point.

Over the last decade the introduction of new technologies into road transport has increased dramatically. Their presence continues to grow, both on roads and in cars, improving safety and aiding drivers to have smooth and comfortable journeys. They suggest routes, help avoid traffic and warn of possible hazards miles ahead. Broadly speaking, drivers have welcomed the help offered by new technologies, although some may have been a little too dependent, as proven by the following example.

Last winter I was travelling around the Lake District in northern England. It had been snowing for some days and there was some disruption on the roads. One of the roads closed was a mountain pass on my planned route. Although it was clearly signposted as closed, I decided to drive through it after being informed at the local pub that it would be alright for my old off-road car. Once I reached the top I had to wait for the snowplough to clear some areas, and while waiting, a standard little car carrying a Saudi Arabian couple arrived on the scene. The snowplough crew and I were quite surprised to see

what the driver had achieved with a little rental car and no previous experience driving in snow, but the question was why? Why had the driver decided to continue all the way to the top when the signs further down the road advised against it? The answer he gave was ‘I just followed the GPS!’ Disregarding all the advice in the form of traffic signs displayed outside his vehicle, the only source of information he had chosen to rely on was the small GPS screen inside his car.

Excessive Reliance on GPS?

Events such as the one described are becoming more and more common. There are dozens of news reports about drivers plunging into rivers and lakes, or almost driving off cliffs. Only recently a driver had to be rescued by helicopter after driving a delivery van up a mountain path in the Swiss Alps. All these *bizarre* episodes have triggered a heated debate over the spiralling effects that GPS and other technology related to road signage might produce on our everyday road trips.



▲ Image 1. Variable message sign on a motorway. Photo: Donald Johansson.

Those in favour of technology in road transport have already predicted that traditional physical traffic signs on the road will eventually disappear. Others go even further, and have begun to envisage a world of automated cars thanks to the development of systems such as the Mercedes Steering Assist (where the driver does not have to steer, brake or accelerate) in Germany and the Driverless Google Car, in the United States.

These ideas may seem a little far-fetched, and many people believe that technology will never actually replace drivers or the traditional devices that guide them. Similar discussions are taking place in the aviation industry, where computers are gradually assuming the responsibility of pilots, and the debate is repeated in all those disciplines in which technology plays a key role.

However, the truth is that new technologies have made their way into the world of road signs. Acceptance of GPS devices is steadily increasing and most drivers are now quite familiar with them. They feel comfortable with the information that is selected and delivered to them at each step, freeing them from what many consider the burden of having to pay constant attention to signs. GPS devices are also convenient when an instruction is missed, for it can be repeated at the press of a button. If adverse weather makes it difficult to see a sign clearly, a graphic representation of it can also be shown on a GPS screen.

Other Road Transport Technologies

Another technology that has been applied to the road is VMS, Variable Message Signs [image 1], the large black panels found on many motorways with LED (light-emitting diode) text featuring dynamic information on changing road conditions. The presence of such signs is increasing as governments choose this technology to deliver selected information to drivers, which can be updated regularly.

Vehicle-triggered signs are another example of technology applied to road signage, automatically activated when drivers are approaching a specific hazard, such as a dangerous curve or a nearby school where children might unexpectedly cross the road. This kind of technology has been in use for many years, warning drivers of their speed limit in a particular area or of any sudden change in road conditions. Having been progressively updated, such signs can now even alert drivers of the fact of being too close to the car in front.

Research in automotive industry is developing further, and now combines all the aforementioned devices in one single information channel—the HUD, Head-up Display—that projects essential information on the inside of a car windscreen [images 2 and 3]. The main advantage of this technology is that drivers do not have to take their eyes of the road in search of information, which is displayed in front of them, designed to be read seamlessly so that drivers are not required to change focus. Like GPS,

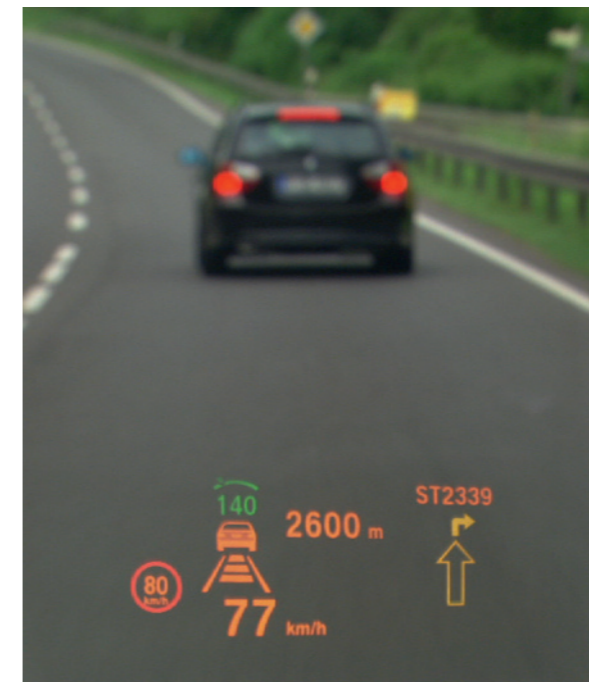
its origins are military, having been developed for fighter jets in the sixties and subsequently applied to civilian aircraft.

Car companies have been experimenting with the HUD design for a number of years, and several brands have recently decided to further its development, combining it with navigation systems. At the moment HUDs are able to display a few prohibition, warning and mandatory traffic signs introduced in the system by mapping companies or read by sensors in front of cars. Extra information such as current speed and distance to the car ahead is also displayed. HUDs are already offered by some brands as an optional extra, and a specific type of HUD is also being developed for motorcycles. Still, Google is one step ahead as the GPS navigation screen is already being used in Google Glass; in future, information may not only travel from the road to the car, but from the road to the eye.

Regulation of Information

One of the drawbacks of these technologies is not knowing who is regulating them and devising their standards. VMSs and driver-triggered signs are maintained and controlled by governments; GPS navigation systems, however, are not. Two main digital mapping companies control most of the market, Navteq and TeleAtlas. Google uses their mapping services, although it has also begun to develop its own. All three are private; as mentioned, the information they show is neither controlled nor regulated by any government, with the exception of information concerning traffic congestion. This brings up a number of legal issues. If a car's sensors misread a speed sign and the maximum speed appears incorrectly on the HUD, who will be blamed if a driver gets a speeding ticket or causes an accident? If data mistakenly introduced by a mapping company leads someone to drive off a cliff, the same

▼ Image 2. Current head-up display. Photo: BMW AG.



▼ Image 3. New head-up display with enhanced navigation systems. Photo: BMW AG.



question arises. As these companies do not update their navigation information when roadworks require roads to be closed, some drivers could perhaps continue to follow GPS directions. In order to avoid such accidents, in 2009 the Dutch government introduced signs warning drivers to turn off their navigation systems at the start of roadworks.

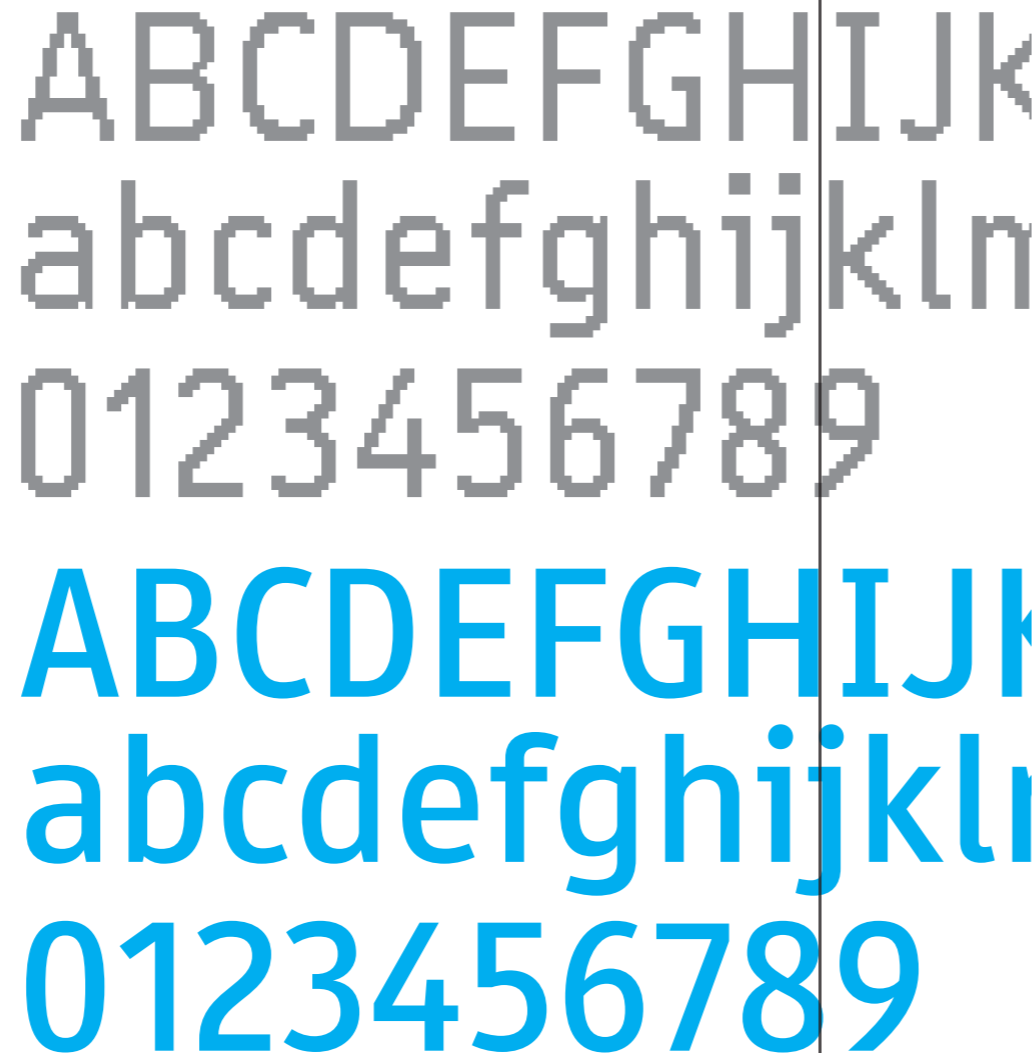
Effects on Road Sign Design

The Dutch have also introduced new modifications in their motorway signage system. As in many other countries, directional signs in Holland used downward pointing arrows to show straight ahead directions, but on a GPS these arrows point upwards, so in 2010 a massive overhaul of motorway signage began by the change in arrow direction. It is important to note that when the government printed brochures to inform of the changes, the fact that the direction of the arrows on the signs matched the ones on the GPS was presented as a benefit for drivers.

Another example of how new technologies can influence road sign design is the TERN typeface [image 4], created as a standard font to be displayed on VMS across the Trans-European Road Network that gives it its name (TERN). Given that this type of signs developed faster than European Union regulations on the matter, a programme has now been devised to standardise them, albeit according to the specific VMS features of each country.

The starting point for TERN was the creation of a typeface to be displayed on VMS/matrix signs. It had to be legible at a distance, at high speed, and had to be consistent with the different LED resolutions in VMS across Europe. Resolution changes according to the number of LED dots per sign, so the shape of letters can vary considerably from one sign to another. In all, up to four different carefully drawn versions of TERN were designed for display on VMS for drivers to find likenesses. TERN was also influenced by the fact that in many countries VMS have reduced space in which to display infor-

▼ Image 4. Two versions of TERN, the top for display on dot matrix systems, and the bottom for display on standard road signs. Source: In-Safety & IIID.



mation, particularly the more advanced signs that include diagrams with traffic congestion data, as a result of which typefaces had to be slightly condensed. Condensed typefaces are not as legible as standard letterforms, so the International Institute for Information Design and designer Erik Spiekermann worked together to make sure the slightly condensed typefaces were as sharp and clear as standard types.

A further version of TERN was subsequently designed for display on standard road signs, consistent with the VMS version to ensure maximum likeness. VMS and standard road signs belong to the same signage system, and therefore must match when placed side by side or close together.

The development of the TERN typeface illustrates how the initial attributes of a type for a new device can influence the final design of traditional road signs. The process begins with a set of requirements to overcome the complexities of designing for a new technology, and only when these requirements have been met is the design applied to the more traditional system. The design process, which has been reversed to emphasise the difficulty of designing a typeface for a system based on new technologies, has proven to be successful. TERN is currently being used on roads and motorways in Austria, and is also the standard typeface on all VMS found on Dutch motorways.

Views on the Possible Future Impact on Road Sign Design

The two cases described exemplify how the increased use of new technologies in road signage is already influencing its design. But what will happen when the devices mentioned earlier, that still have some reliability issues, are perfected? If these devices become dependable and can update drivers regarding road conditions in an even more efficient way than they do today, the number of drivers relying on GPS navigation is likely to increase at an

even faster pace than it is at present. Moreover, if HUD technology continues to evolve and soon becomes affordable, like GPS it could certainly affect the future design of road signs.

As mentioned previously, some even forecast the total disappearance of traffic signs on roads, although at the moment such a scenario seems scarcely credible, as the human factor must also be taken into account. While technology is instigating the change in road signage, changing the habits of drivers may take longer, so a certain amount of information should still appear on roads. Information that is repeated to drivers from outside their vehicles provides security in case the system fails, and is also useful to make sure the system is working correctly. Drivers should be able to double-check if the information they receive both inside and outside the car matches.

Having established that some form of standard road signage will remain on roads, the next step is to define its content. What information should be left simply to confirm instructions issued inside the car? When driving we usually follow a directional sign to one destination, or one that will lead us to our journey's end. But on motorway junctions in busy areas we are often presented with an overwhelming number of directional signs to various destinations.

In the picture of a German motorway junction twelve destinations are orderly displayed on three panels [image 5]. However, if our GPS told us what direction to follow, we could avoid having to find our direction from among the twelve, and therefore skip a step in our decision process. The fact that signs displaying destinations take up a considerable amount of space is another reason to think that they could disappear in future.

For a long time, omitting destinations in some directional signs has been a common practice in the United States. At many road intersections a shield with a route number identifies the road and an arrow gives the direction, and cardinal directions are also provided [image 6].



▲ Image 5. Twelve destinations shown to drivers at the Frankfurter Kreuz junction, Germany. Photo: Thomas Pullicino.

The idea of using road numbers alone could be taken even further. Since drivers are being directed to their destination by route numbers, these could also be dropped and the system made even simpler by just numbering the lanes on a motorway. This could make things easier for drivers, given that road numbering schemes in some countries can be complex and result in roads being identified with long codes. Thus, the instruction ‘Take lane 3’ is easier and faster to process than ‘Take the A627[M]’ (a motorway in the area of Manchester).

Unfortunately, this idea has a couple of drawbacks. Even if it does manage to reduce the amount of information outside vehicles to the minimum, it could also prove confusing to drivers. At each junction the direction one has to follow may change, and since the layout of junctions can also change, one could very well have to follow different numbers at every stage of one’s journey, and many changes can be error-prone. Moreover, if the GPS system is down or the HUD in the car is unavailable, to reach a des-

tinuation simply following lane numbers would be almost impossible. On the other hand, if road numbers are displayed, drivers could reach their destinations consulting road maps.

The ideas presented here are suggestive of how signs could change in the future. Signs may become smaller, include no destinations and have only numbers to identifying lanes or roads. Arrows and numbers would become more relevant and would consequently be larger. Designs would confirm that what drivers are being shown by their navigation systems corresponds to the directions they have to take to reach their destinations. The information displayed inside cars should be also appropriately designed, with all elements placed in an orderly manner to ensure drivers are not overloaded with unnecessary information that could prove distracting, or even block their field of vision. Data displayed inside and outside cars should have the same graphic design, and this could be achieved if the information shown by such devices is regulated and standardised.



▲ Image 6. Route number shields with arrows and cardinal direction, United States. Photo: Footer.

“The information displayed inside cars should be also appropriately designed, with all elements placed in an orderly manner”

Conclusion

The strong and steady steps new technologies are taking in road transport are obvious. As drivers progressively rely on them to ensure smooth and safe travel, they have gradually become an essential tool in this field. Moreover, governments use them extensively to enhance their communication with drivers, a trend that appears to be on the increase and should not be overlooked.

The hypothesis presented on how new technologies may affect the design of road signs intends to illustrate the fact that designers will necessarily have to face up to new challenges. In all likelihood, they will have to come up with clearer and smarter solutions for rethinking a key device in road transport, the road sign, which may have to undergo a radical process of transformation.

In 1983 Jock Kinneir, designer of Britain’s road and motorway signage system in the sixties, described the approach he and his team took when creating their iconic designs: ‘We went for the ut-

most simplicity, cutting out everything which didn’t actually say anything (like serifs on letters, and boxes around lettering) and went on cutting and cutting until we were left with the residue, and then gave that the greatest value possible’.¹

As new technologies continue to advance, there will come a point when essential and trustworthy information for drivers will be transferred from roads to cars, a point when it is likely that the ‘cutting’ could start all over again.

¹ ‘The Ubiquitous Alphabets of Jock Kinneir’, quoted in O. Lund, ‘The Public Debate on Jock Kinneir’s Road Sign Alphabet,’ *Typography Papers* 5, University of Reading, Reading, 2003, pp.103-126.