

Highways UK 2017 Intelligent Infrastructure Challenges

1. Highways England

As a business, safety is our first imperative and our core value; it is central to how we work throughout the organisation and actions associated with improving safety performance are at the heart of what we do as a company. As set out in our Health & Safety Five Year Plan, Highways England has a target to reduce road user casualties and Accident Frequency Rates for both our Traffic Officer Service and supply chain partners.

We believe that new emerging technology has the potential to have a significant influence and impact on safety performance. Therefore, we are reaching out to industry seeking ways to take advantage of innovative technology to improve safety.

Aspects that may help provide focus for the competition include, but are not limited to:

- Safer Roads - Raise inherent safety and protective quality of the network
- Safer Vehicles – Encourage deployment of improved vehicle safety technologies
- Safer People – Develop intelligence led innovation to improve road user behaviour
- Reducing incursions into roadworks
- Increasing the safety of man-machine interface
- Reducing the number of incidents due to severe weather conditions
- Taking advantage of modern technology for more effective training purposes
- Reducing the number and severity of incidents eg involving heavy goods vehicles
- Developing and deploying technology to prevent, detect or monitor incidents

(Ref: Paul Doney, www.highwaysengland.co.uk)

2. Transport Scotland

Transport Scotland, along with other key stakeholders have been working towards meeting the Scottish Government's ambitious targets to reduce road deaths and serious injuries on Scotland's roads by 2020. The results to date have been encouraging but clearly it remains the case that one road death is one too many.

Like other countries, in Scotland there are certain vulnerable road user groups where more could be achieved. Specifically

- children
- older people
- cyclists
- motorcyclists

The reasons why these groups remain a prominent road safety challenge very, albeit they are all linked by socio-economic and demographic changes.

Transport Scotland would welcome exploration of innovative technology solutions that might help to directly reduce road deaths in one or more of these road user groups.

(Ref: Hugh Gillies Transport Scotland www.transport.gov.scot)

3. England's Economic Heartland

As part of its Transport Strategy England's Economic Heartland will identify a Major Road Network – a network that identifies the economically important roads for the Heartland. The Major Road Network will be a combination of Highways England's Strategic Road Network and the more significant local authority owned/managed roads.

Providing timely information to road users is seen by England's Economic Heartland as being central to the user experience. Providing reliable information on the level of service available on the Major Road Network is likewise seen as being important in providing confidence for investors. Managing the Major Road Network during periods of heavy demand and/or periods of disruption (whether planned or unplanned) is an important part of the Transport Strategy for the Heartland. England's Economic Heartland Strategic Alliance is therefore looking for a solution that enables the provision of timely information for road users on the Major Road Network. The solution should be capable of offering bespoke advice – i.e. offering solutions to individual road users that reflect their own needs/circumstances.

The challenge is potentially two-fold: firstly the collection/collation of data that allows the current performance of the network to be determined: secondly, the dissemination of meaningful information to road users (potentially differentiating between personal, business and public transport users)

(ref: Martin Tugwell www.englandseconomicheartland.com)

4. Transport for the North

Building on Transport for the North's Integrated and Smart Travel work, how can partners utilise open datasets to help provide genuinely multi-modal travel information that enables customers to travel by a range of modes, including understanding how any changes or disruption affect their journey and the alternatives available to them, thereby supporting transformation of the North's economy?

(ref: Ginny Leonard www.transportfornorth.com)

5. Air Quality Task Force - Improving Air Quality in London

Air quality has continued to rise up the list of top concerns for Londoners. In March 2016, only a few months before the Mayoral election, 43% of Londoners listed air quality as their biggest health threat, more than drug use, stress or poor diet. When asking parents whether they were concerned for their children's health because of poor air quality, more than two thirds said they were.¹

Sadly, the fears of the health risks caused by air pollution are well founded. Every year, it takes only a few days for a number of central areas in London to breach the Nitrogen Dioxide hourly EU legal limit value for the calendar year. 52,000 life-years were lost due to man-made particulate matter in London in 2010 – a cost that is being felt by people across the capital.²

The Solution

The Air Quality Taskforce seeks innovative solutions to this life threatening problem.

Ref: <https://www.ice.org.uk/news-and-insight/ice-thinks/growing-cities-and-building-resilience/air-quality>

6. Bristol City Council: Affordable Microsimulation Modelling for Local Authorities

Like many Local Authorities, Bristol City Council is committed to tackling congestion and supporting Bristol's economic growth. To this end, the council run a traffic control service which aims to keep traffic moving around the city network by making the best use of the available road network and providing accurate, up to date traffic and travel information to the public.

In order to achieve this, the traffic control team utilise Urban Traffic Management and Control (UTMC) systems. A number of different technologies are used, including a car park guidance system and a variable message signage system, which allows traffic control staff to pass messages to drivers at the roadside. The most critical system in use is the UTC/SCOOT traffic signal control system. This system connects all sets of traffic signals in the city to a central computer, which uses live traffic flow data from on street detectors and automatically adjusts signal timings to provide more green on the busier approaches when required. It also calculates offsets between sets of signals to minimise wasted green time and maximise the capacity of the available road network. However, this does not mean that the system can *increase* capacity. The UTC system attempts to run the network as close to 100% capacity as possible, by minimising wasted green time and assisting vehicle progression through the network. This can provide an improvement of 5 – 12% over local traffic signal control methods. Furthermore, during incidents, roadworks or events on the network, traffic control staff intervene, making changes to the working of the SCOOT model to minimise the impact of the incident.

All of these technologies and interventions have assisted the city to manage increasing traffic flow levels to date. However, traffic flow levels in the city are continuing to increase and are now at extremely high levels. The difference between the capacity of the city network and the level of traffic demand is now so large that at busy times of year, the network has been caused to 'lock up'. This is due to the volume of traffic in the network, causing queuing traffic to 'interact' with other traffic movements and cause blockages. This causes a shockwave of queuing traffic that fans out across the network and affects the whole ci

Additional capacity cannot be generated by the UTC/ SCOOT system and nor can it be built. Therefore, as traffic flows have reached unprecedented levels and there is neither the budget nor available land to build additional road space, new thinking is required. Basically, a step change is needed in the way the city manages its road network.

The Solution? Bristol City Council invites the industry to develop an even better way of managing the road network.

(Ref Barney Smith www.bristol.gov.uk)