

Intelligent Infrastructure Systems



Movement of things and people is an essential part of economic activity. But it uses up a high and growing proportion of many resources, not least time. Foresight's fifty year view of the future of intelligent transport infrastructure, its implications and its social context looked at how properly deployed intelligence could maximise the benefits and minimise the social and environmental costs of transport over the coming half-century.

WE FOUND:

- Transport infrastructure will change radically over the next 50 years. Scientific and technological developments will change what we define as infrastructure – not only what we travel on, but the vehicles we travel in and the information we have about the system.
- Intelligent infrastructure will only deliver the benefits we desire if we invest at four levels:
 - As we build new infrastructure we must build the sensor networks to allow us to monitor in real time what is happening, to inform the user. We would no longer need to guess the best route.
 - We need to build intelligence into the infrastructure. We need an infrastructure that self-adapts to the needs of the users. A world in which the bus waits for us rather than the other way around.
 - The amount we need to move is determined by the spatial spread of the places we need to get to. We need a new philosophy and delivery in urban design to cut out unnecessary distance from our journeys, to ensure our communities, and the environment, thrive.
 - We also must support intelligent use of the infrastructure. In the past we have used reductions in the cost of travel to travel further. We need to ensure that costs are built into travel so that as a society we choose patterns of movement that are sustainable.

Possible transport futures

(courtesy of Narinder Sagoo, Foster and Partners)



WE ASKED: How might science and technology be applied over the next 50 years to the design and implementation of intelligent infrastructure for transport and its alternatives that are robust, sustainable and safe.

WE AIMED

- To encourage open and creative discussion between research experts, service providers, policy and investment decision makers and the public on our future ability to bring intelligence into infrastructure.
- To provide an evidence base of the existing science and technology to inform thinking and to identify future research needs.

WE PRODUCED

- An overview report with a view of the opportunities and challenges that intelligent infrastructure could deliver, the presumptions that underpin the decisions we make and the strategic choices that we face.
- 18 state of science reviews on: materials, networks, data collection and processing; artificial intelligence and data management; social implications; environmental sustainability; and policy and economics.
- A plausible forward look at how people might use the emerging technologies.
- A set of scenarios exploring possible futures, with a social commentary as to how these might impact different groups.
- A 'Next Steps' document recording the commitments of government departments, the private sector and relevant stakeholders.



THE WAY AHEAD

- We have already seen the birth of this infrastructure, as more and more sensors are being embedded into our roads and vehicles, and hand-held mobile devices become ubiquitous. But we know that infrastructure – our shared resources for travel, communication and our urban environment, and the choices people make in its use – will not automatically develop intelligently.
- We must ensure that we join up work in Government, so that our investment strategies into our urban environment and infrastructures of transport and communications are developed together. This includes setting the right standards and tackling the challenges around security, privacy and robustness of complex systems.
- Foresight will continue to work with organisations within and outside government to feed the project's findings into strategic planning decisions. The government's Chief Scientific Adviser has committed to review progress after one year and will report the final value of the work to the Prime Minister. This review will be published in 2007.



FURTHER INFORMATION:

- Project reports and documents are available via our website, www.foresight.gov.uk
Specific queries can be directed to Foresight, Office of Science and Innovation, 1 Victoria Street, London SW1H 0ET;
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