Highway solutions for safe, on-time and connected journeys
Do you know that Nokia is the mission-critical highway solutions provider?
The Nokia mission-critical communications portfolio helps operators address the highway industry challenges

**Increased congestion and pollution**

- **$1 trillion**: Estimated cost of air pollution in OECD countries due to road transport emissions
- **1.2 billion**: Estimated number of vehicles on the roads today
- **6.9 billion**: Estimated hours of traffic delays caused by congestion only in the US in 2014
- **+66%**: +66% vehicles on the road by 2035

**Pressure to reduce road fatalities**

- **1.25 million**: Estimated road traffic related fatalities in 2013
- **90%**: 90% of road fatalities caused by human error

**Changing connectivity demands of drivers**

- **62%**: 62% of new vehicles built in 2020 connect to the internet
- **250 million**: Estimated number of connected vehicles on the roads in 2020

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Enabling operational efficiency for safe, on-time, and connected highway journeys through a single intelligent multiservice and ultra-broadband network architecture for all communications needs of Intelligent Transportation Systems and through professional network services.
Nokia is a unique vendor in the industry with a complete end-to-end mission-critical highway communications portfolio.

One intelligent communications network for highways

- LTE-4G and Wi-Fi
- Passive Optical LAN
- IP/MPLS
- Optical Transport and Microwave Packet Radio
- Network Security
- Professional Network Services
Nokia is shaping the future of mobility with vehicle-to-everything over cellular networks.

Nokia is a strategic technology advisor for vehicle-to-everything

- Research with Bell Labs
- In-house product development
- Product development cooperation
- Industry associations

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Global track record of reference projects with communications networks for highways and vehicle-to-everything over cellular

- Selected deployments of communications networks to support Intelligent Transportation Systems
- Public vehicle-to-everything market trials
Deploying an IP/MPLS and ultra-broadband communications network for England’s motorways

“We chose Nokia because of their technology, their approach, and their commitment to deliver this contract.”
Ron Davison, Managing Director of GeneSYS

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<td>Highways England suffers from a fragmented, aging and expensive-to-run communications system with a • Legacy of 40 years of highway growth and regional control of roads • Patchwork of over 30 voice, video and data networks</td>
<td>Nokia delivers an end-to-end communications solution including • Core and edge IP/MPLS network • Core and edge WDM network • Service and performance management • Legacy integration</td>
<td>One integrated communications network helps Highways England to • Optimize operational costs • Offer travelers safer and more reliable journeys • Flexibly expand the network to meet the future demand of intelligent transportation</td>
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World’s first showcase of vehicle-to-everything communications over cellular on the German digital motorway A9

**Challenge**
Cellular networks need to meet the demanding requirements of vehicle-to-everything use cases such as
- Co-operative passing assistance
- Electronic break light

**Solutions**
Nokia field proofs Multi-access Edge Computing (MEC) in Deutsche Telekom’s live LTE network in collaboration with Continental and Fraunhofer ESK

**Benefits**
Multi-access Edge Computing enables low application latencies of 10-15ms with near real-time communication between vehicles, improving road safety
Why one intelligent communications network for highways from Nokia?

Increased congestions and pollution, road fatalities and changing connectivity demands of travelers are some of the challenges faced by the highway industry. By evolving into truly Intelligent Transportation Systems, highway agencies and departments of transportation can ensure safe, on-time and connected journeys.

Communications networks interconnect roadside equipment, vehicles, travelers, roadside workers and all highway stakeholders with each other and with traffic control centers. They are the path to providing reliable, voice, video and data services to improve traffic flow, lower traffic pollution, increasing traffic safety and enhancing traveler experience.

Nokia helps highway agencies and departments of transportation to build Intelligent Transportation Systems by offering a full set of IP and ultra-broadband products based on 25+ years of highway industry experience and expertise in mission-critical communications. Supporting IP-based applications and mission-critical services on a single intelligent communications network, improves efficiency of operations and reduces the total cost of ownership (TCO). Nokia allows a smooth migration of legacy products and services towards the next generation of highway communications technology and enables future-proof investments preparing the highways for vehicle-to-everything communications.

For further information, case studies and commentary, visit networks.nokia.com/highways

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