TAMPERE ROAD TUNNEL – ROAD TRAFFIC
INDUSTRIAL PLANT IN THE MIDDLE OF THE CITY

The Intelligent Transport Systems (ITS) segment is one of the most significant users of Industrial IoT technologies. ITS systems aim to increase the fluency, safety and environmental friendliness of the transport systems.

Road traffic tunnels tend to be the most challenging parts of the roads when it comes to the administration of traffic and environmental conditions. In particular city centre tunnels are heavily populated with traffic and tunnel control systems need to instantly react to traffic situation changes, possible hazardous situations and start preventive actions immediately. The development of road traffic tunnel safety systems is especially based on regulations established in the EU's 2004 tunnel directive (2004/54/EY). The directive aims to ensure that all road traffic tunnels more than 500 meters long fulfil the minimum safety requirements set in the directive.

Tampere road tunnel is the longest (2.4 km) and technically most advanced road tunnel in Finland. Technical systems operations are based on the wide-scale surveillance of traffic and environmental conditions. Traffic fluency is assured with automatically controlled traffic controlling equipment and with other safety systems. The Tampere tunnel automation system is comparable to the systems in medium-sized industrial plants.

Covering situational awareness
In Tampere, accurate traffic situation awareness is confirmed with almost 150 incident detection and CCTV cameras as well as inductive loops placed under the road surface. All incidents inside the tunnel are recognized by applications analyzing incident detection camera streams and with loops. The tunnel air quality, air flow and visibility are analyzed in more than 30 different observation points. The tunnel roof consists of 16 kilometres of fibre-optic heat detection cable, which recognizes possible fires with an accuracy of a couple of meters. All this makes sure the instant recognition of hazardous situations, as well as correctly targeted and adjusted safety procedures.

Traffic fluency and safety guaranteed with safety technology
Accurate situational awareness enables efficient tunnel management. The tunnel management system is the key element, confirming the interoperability between data collecting, traffic controlling as well as all other tunnel subsystems. Over one hundred changeable traffic controlling signs take care of the traffic safety and fluency inside the tunnel. Over 75 air blowers push air into the massive air conditioning pipes and keep the air fresh inside the tunnel. Lighting is automatically adjusted, so that lighting level at the entry and exit points correlates to the outside lighting. Tunnel also consist unique active fire protection method with fire sprinkler system.

Comprehensive safety technology also needs heavy infra systems. Electric power for the tunnel systems is distributed by a 20 kV high-voltage distribution system commonly used in electric distribution company networks and the water treatment capacity in the tunnel is comparable to a large spa. Coverage for VIRVE (network for Finnish authorities, such as the police, fire department) and mobile network is guaranteed inside the tunnel, from where you can also have a direct telephone connection to the rescue department at 50 different points.

All of this does not necessarily come to one’s mind while driving through the tunnel.

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ITS SYSTEMS WITH ALMOST 20 YEARS OF EXPERIENCE
Nodeon automation and ICT experts have experience of more than 100 ITS projects during the last 20 years, especially with traffic control systems in road tunnels and on motorways from pre-designing to system implementation and commissioning.