ELCOM

Power Automation
& System Engineering

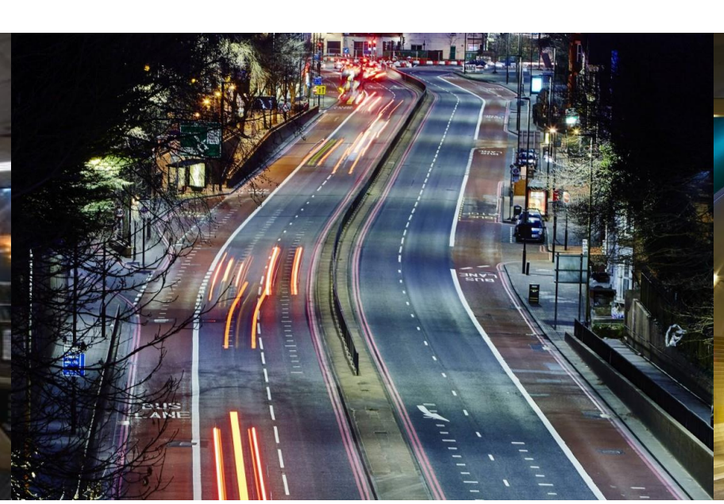
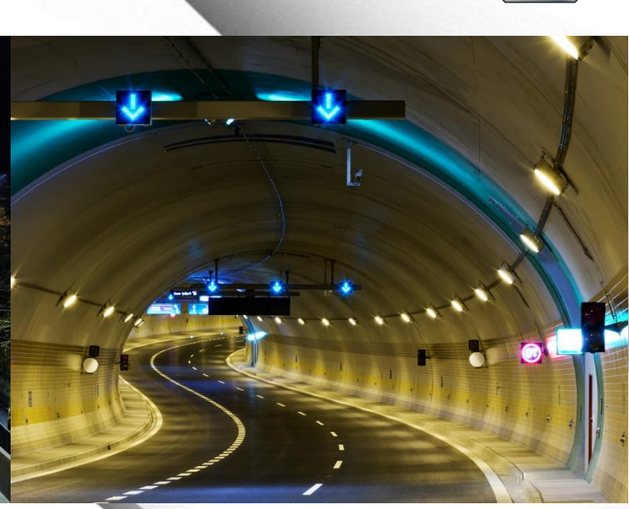
**28 years
with You!**

Solutions for Mobility

Tunnel Power Supply and Management
Traffic Managment

TÜV SÜD



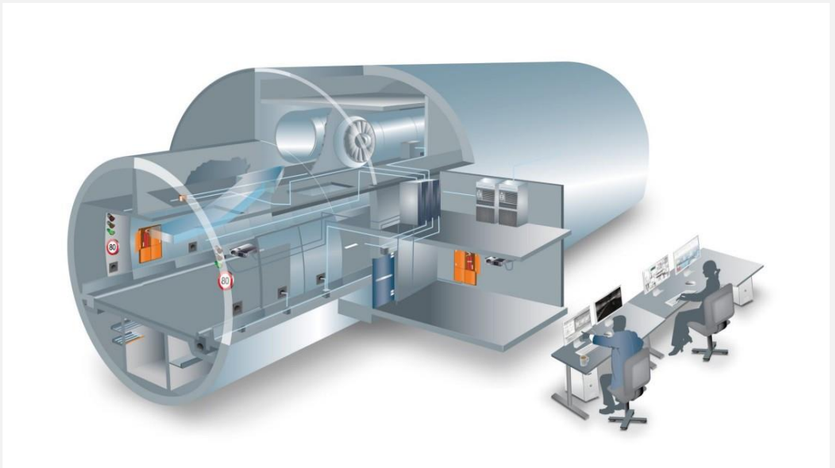



www.elcom.ba

Main task

Complete tunnel technology from a single source

Maximum safety and security for both, road users and operators



Design and installation in according to law, rules and standard in BiH and EU

- Directive 2004/54/EC on minimum safety requirements for tunnels in the Trans-European Road Network
- Austrian Guideline RVS_09.02.22 Operation and Safety Facilities, Tunnel Equipment
- Germany Guideline for road tunnel equipment and operation RABT
- A set of instructions for designing, purchasing, installing and maintaining elements, objects or parts of motorway facilities (JP FBiH Motorways 2013)

Tunnel Management

- One system for all automation tasks in tunnels

Measurements

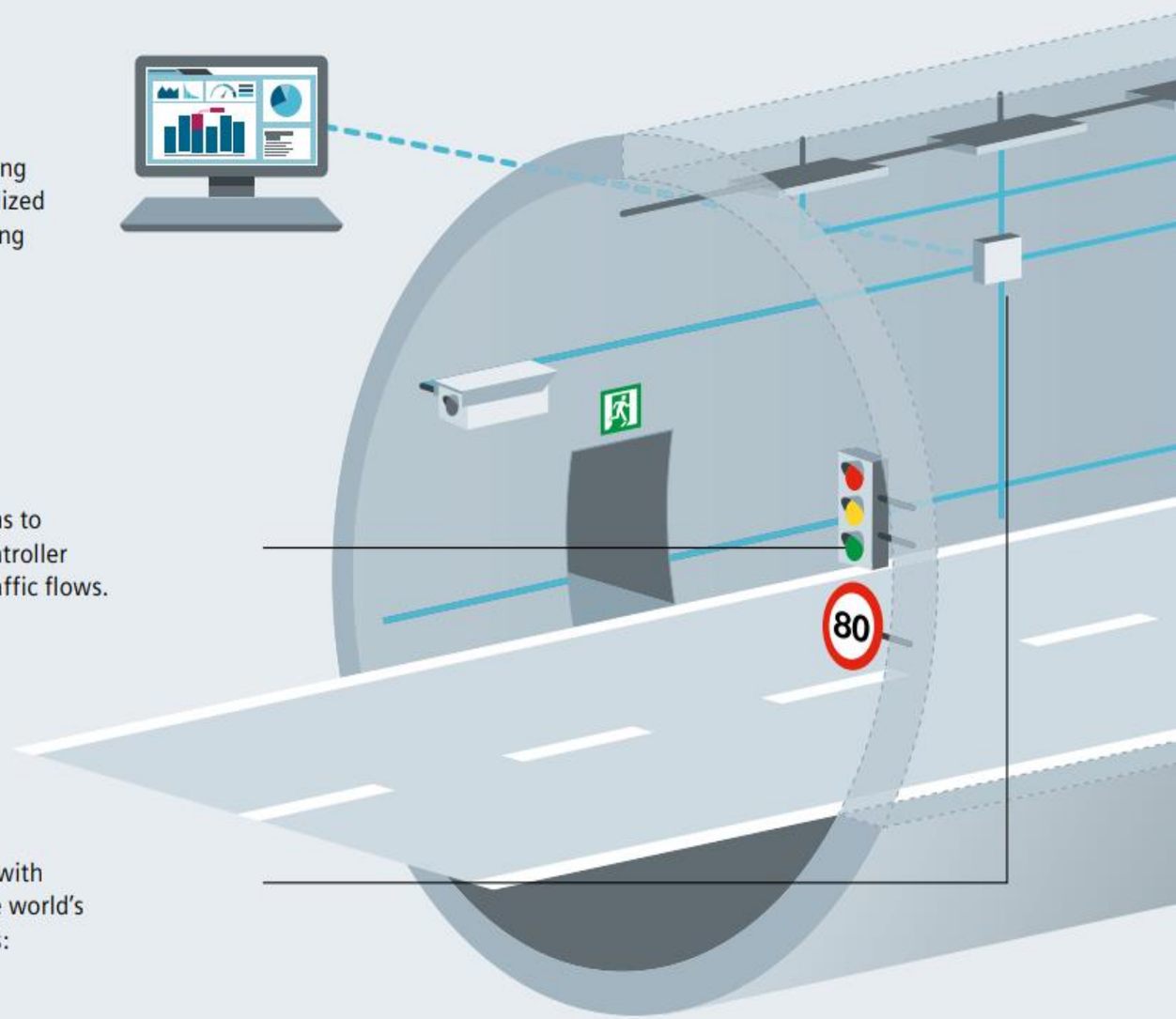
Simple connection of measuring instruments through standardized interfaces for further processing in the control system.

Road signs

Direct connection of road signs to the control system via the controller which facilitates optimized traffic flows.

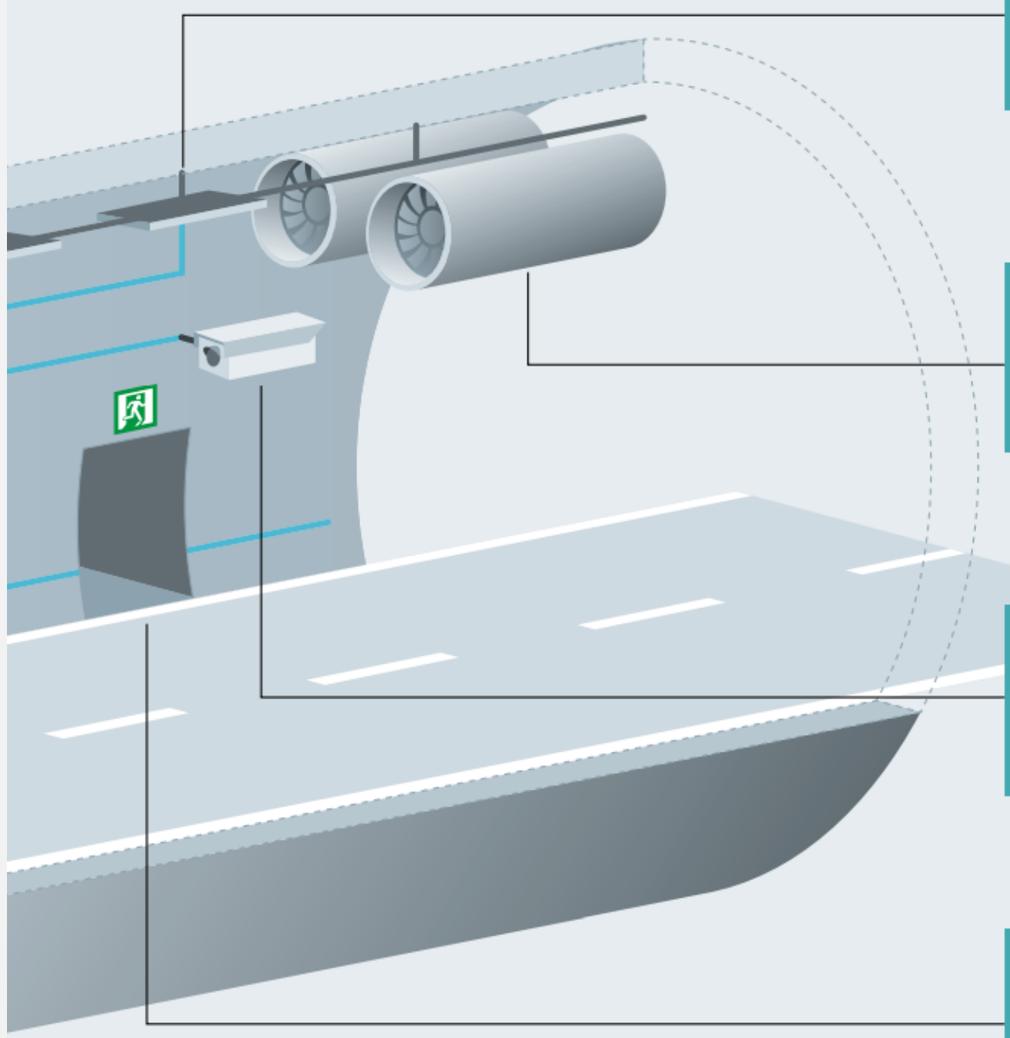
Networking

Future-proof communication with products and solutions for the world's leading industrial bus systems: PROFIBUS and PROFINET.



Tunnel Management

- One system for all automation tasks in tunnels



Lighting

Function monitoring and lighting control can be adjusted for optimal visibility to match the traffic situation.

Ventilation

High-availability controllers allow the reliable operation of complex ventilation programs to protect people and structures in every situation.

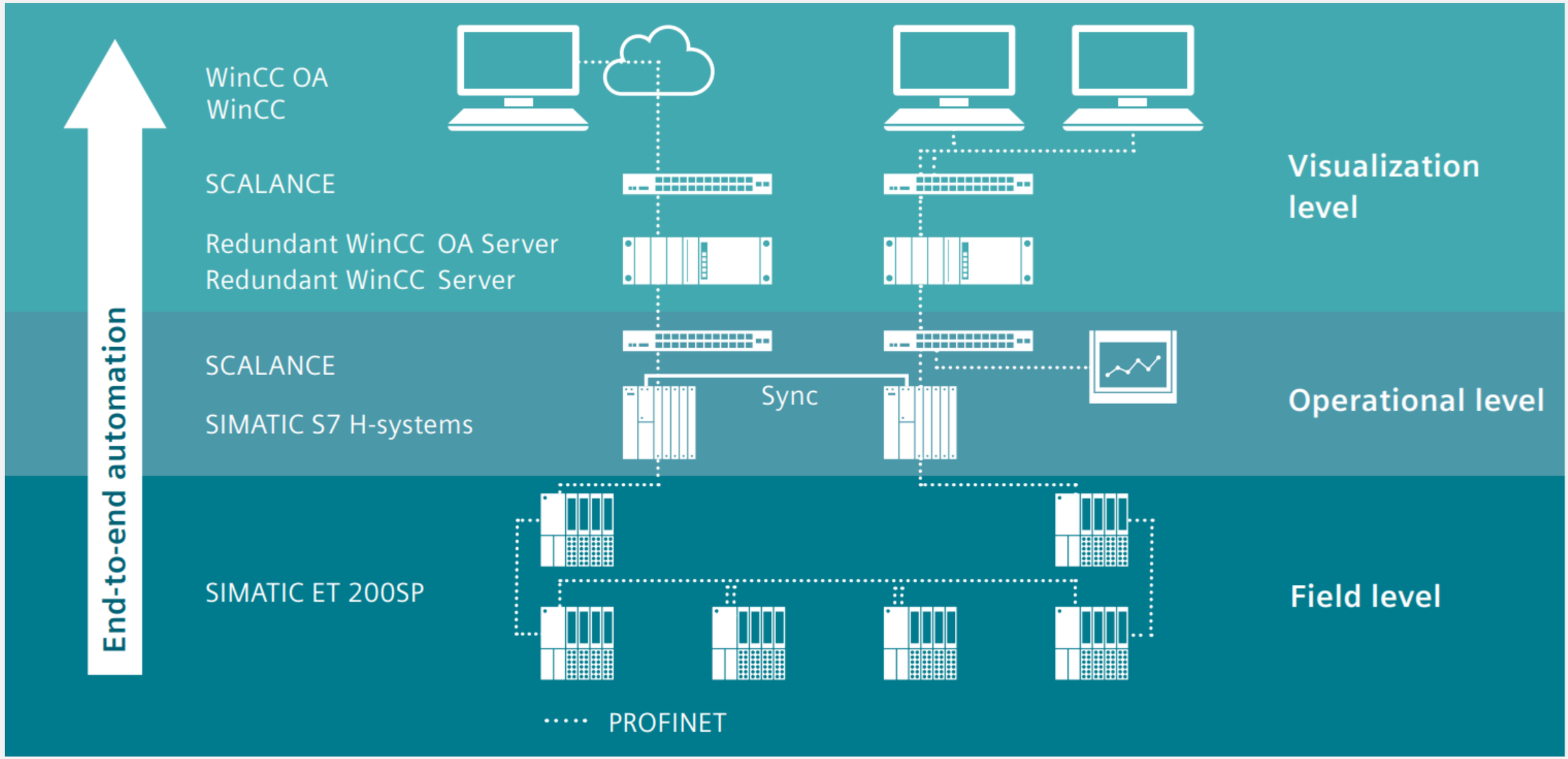
Video surveillance

Hazardous situations are detected at an early stage thanks to the simple integration of the video surveillance into the SCADA system with end-to-end functionality.

Escape routes

The integration of all signals into the automation system ensures that escape routes and emergency call niches are reliably signposted at all times.

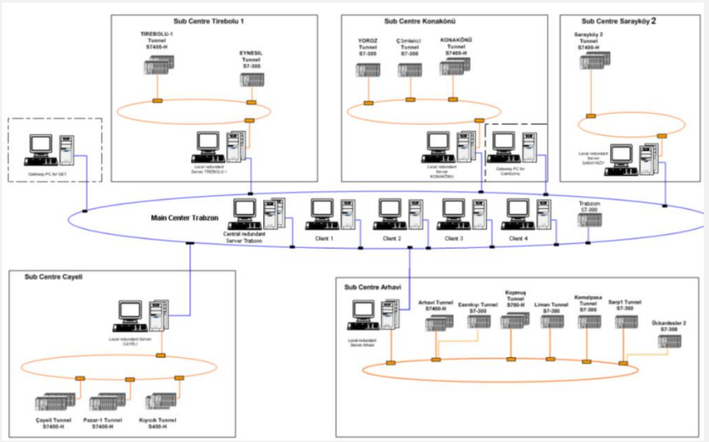
Tunnel Management

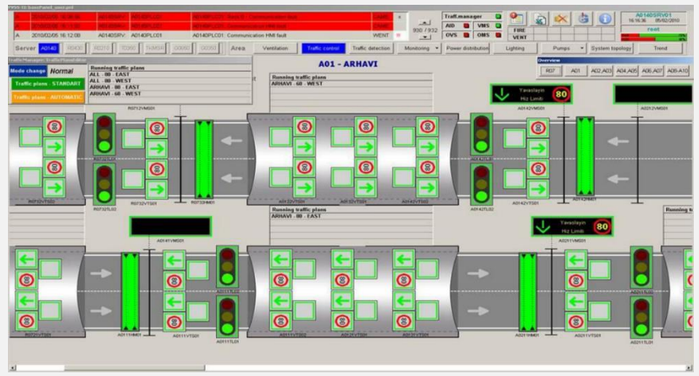


Tunnel Management
Visualization level

SIMATIC WinCC Open Architecture

- Scalable, flexible and open SCADA standard software Efficiency
- Advantages in the tunnel
  - Hot-standby redundancy can be seamlessly integrated into the redundancy concept of tunnel systems
  - The scalable layout allows the integration of many data points of the often widely distributed tunnel systems - particularly advantageous if there is a central control room

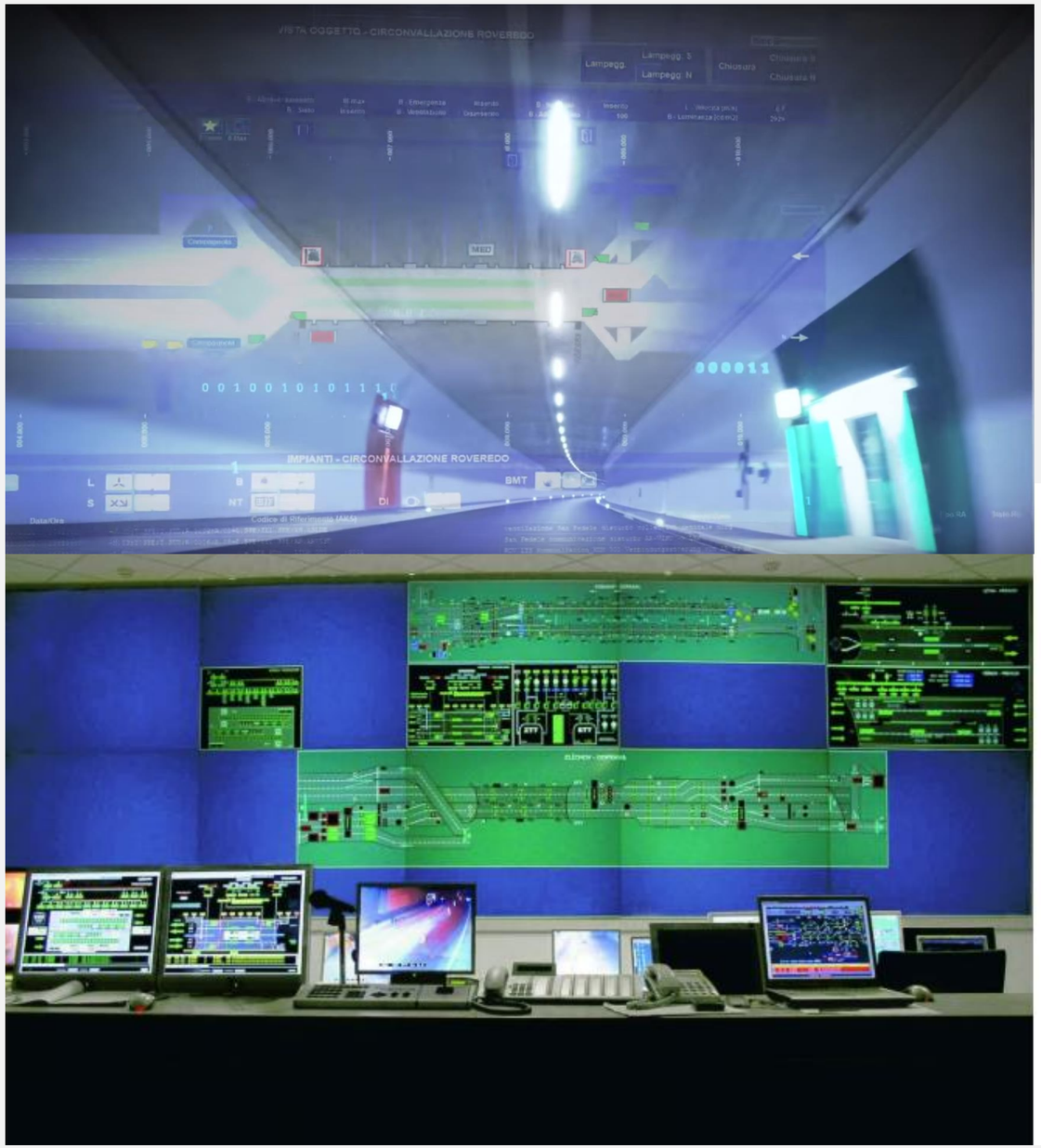




Tunnel Management
Visualization level

SIMATIC WinCC (SCADA)

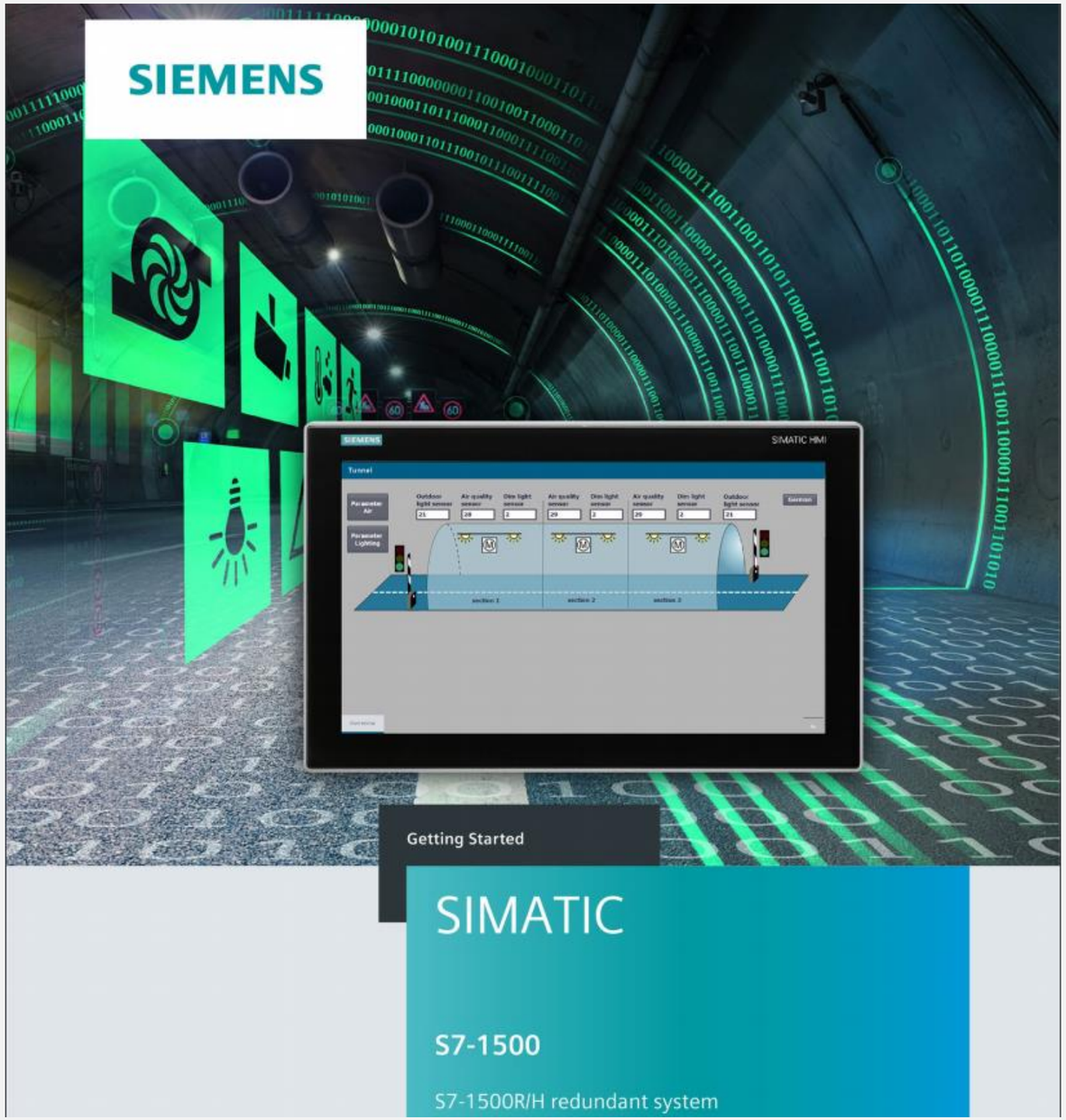
- Scalable, flexible and open SCADA standard software Efficiency
- Advantages in the tunnel
  - The redundancy function corresponds to all of the specifications of a redundancy concept for tunnel systems - from the station in the tunnel to the central control room
  - The automation components can be optimally integrated into the SCADA system



Tunnel Management
Operational level

SIMATIC S7-1500 R/H

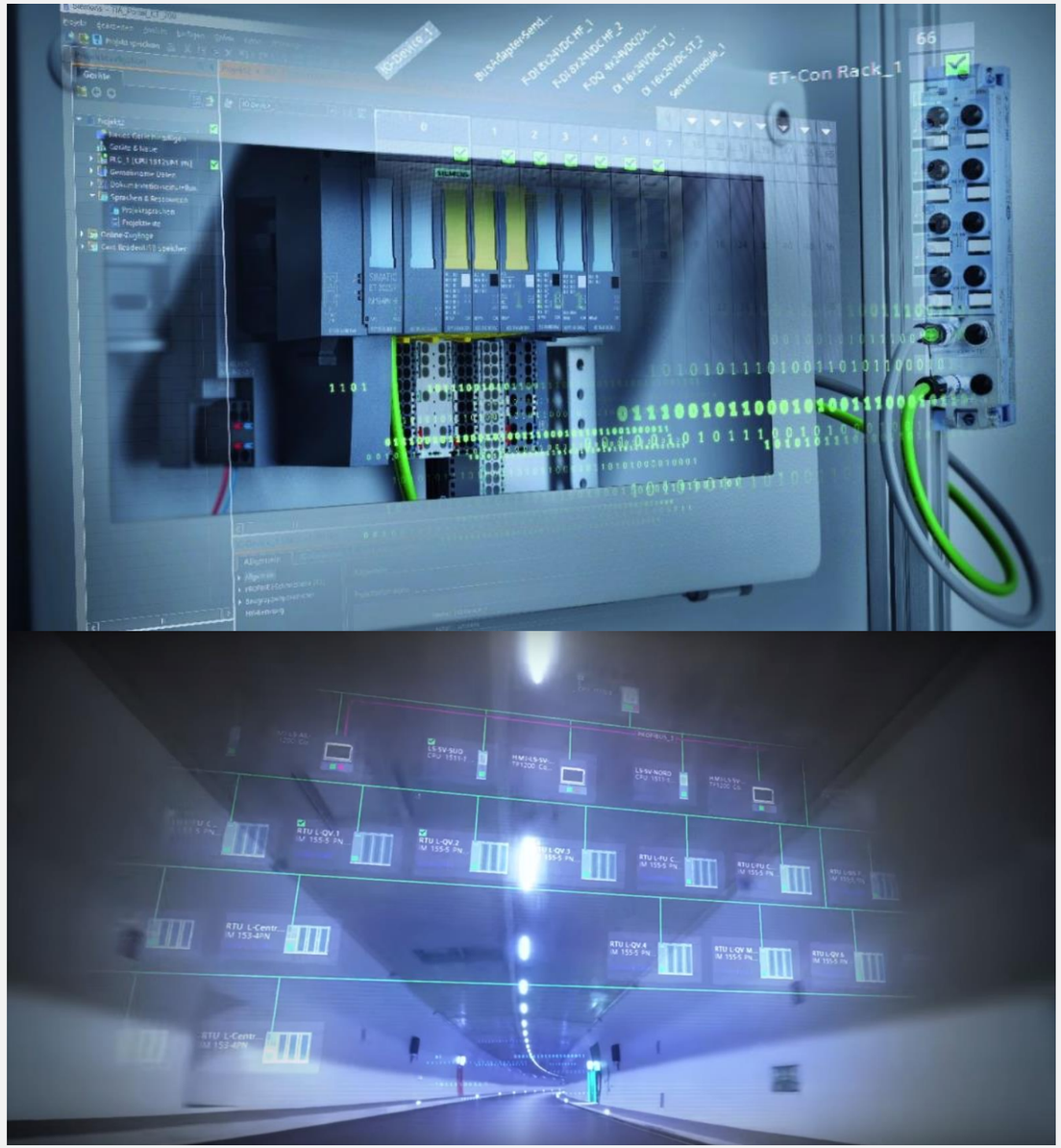
- Advantages in the tunnel
  - The scalable layout allows an integrated solution, from the automation of an avalanche protection tunnel to the controlling of complex ventilation systems with fault-tolerant automation components
  - If the safety requirements increase, the controllers can be expanded by adding new fail-safe software blocks, thus providing optimal investment protection
  - System redundancy is a given, from the portal all the way to the emergency bay
  - Setup of the controllers in the separated portals allows greater fail-safety of the components



Tunnel Management
Field level

SIMATIC ET 200

- Advantages in the tunnel
  - Due to the distributed layout, the signals can be recorded directly in the sub-distributors in the tunnel - long cable routes are thus omitted
  - The distributed I/O system increases the availability of the overall system due to the redundant connection of the modules and bus system

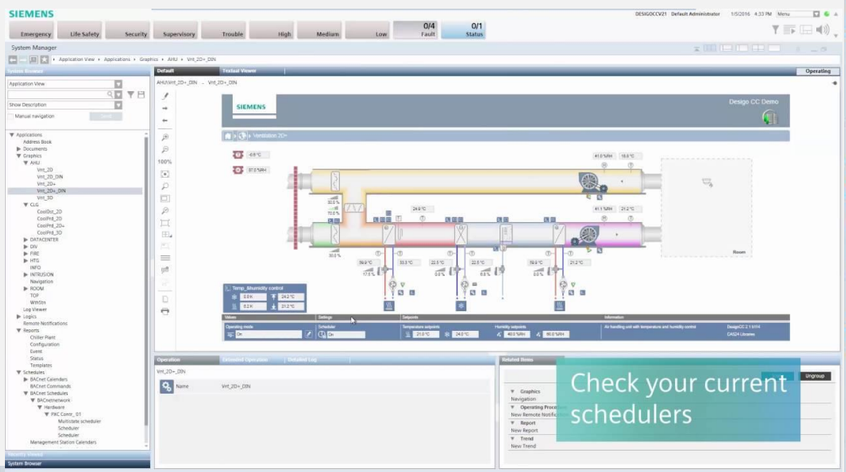


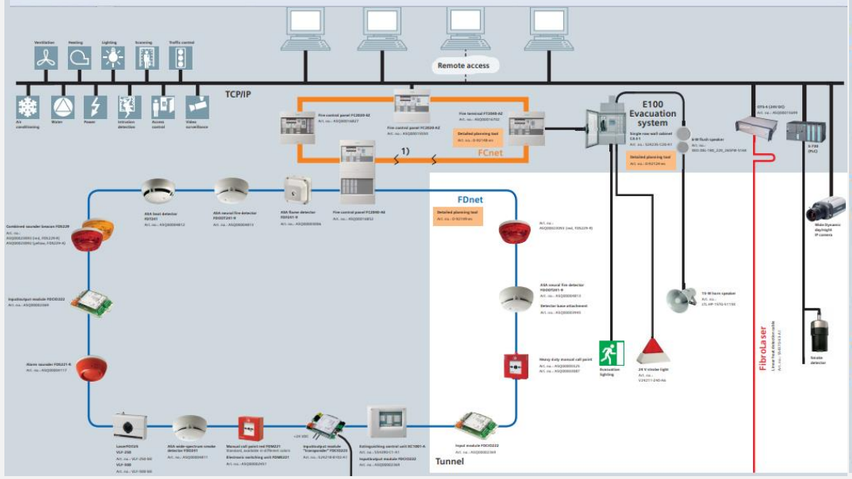
ELCOM

Tunnel Power Supply and Management

Tunnel Management
Field level

Fire safety solutions





Fire control panels

The Sinteso™ FC20 fire control panels with integrated power supply offer a logical, menu-driven user interface with interactive, dialogue-based procedures. Network up to 32 panels via FCnet (ideal when multiple tunnels are monitored via 1 control center). The panels are scalable remotely over Ethernet (remote operation, system diagnosis/configuration changes, simple maintenance, and troubleshooting).

Voice alarm system 1

The E100 voice alarm system linked to loudspeakers in shelters and exits. Automatically activated by the fire detection system on confirmed alarm, and capable of broadcasting live or pre-recorded evacuation messages to users to ensure safe and rapid evacuation of the tunnel tubes.

Extinguishing control panels 2

The XC10 range includes control units for single or multiple (up to 16) detection zones/extinguishing sectors. All relevant incidents are forwarded to connected fire control panels. The XC10 units also interface with ventilation systems.

Linear heat detection 3

The FibroLaser™ fiber optic cable detects both radiated and convected heat, reducing the influence of airflow on the detection rate. It gives instant information on the fire size, direction and speed, the number of fire sources, and the temperature inside the tunnel (with graphical visualization, data refresh cycle time <15 seconds). The cable is maintenance-free (operating life of 30 years).

Smoke detectors 4

Early fire warning by smoke detection in road tunnels with high ceilings and ventilation levels thanks to the continuous measurement of smoke concentration. These detectors are also ideal in environments with corrosive atmospheres, and offer fog suppression by heating. A temperature sensor enables the location of fires. Signal output via relay contacts or Profibus.

Aspirating smoke detection 5

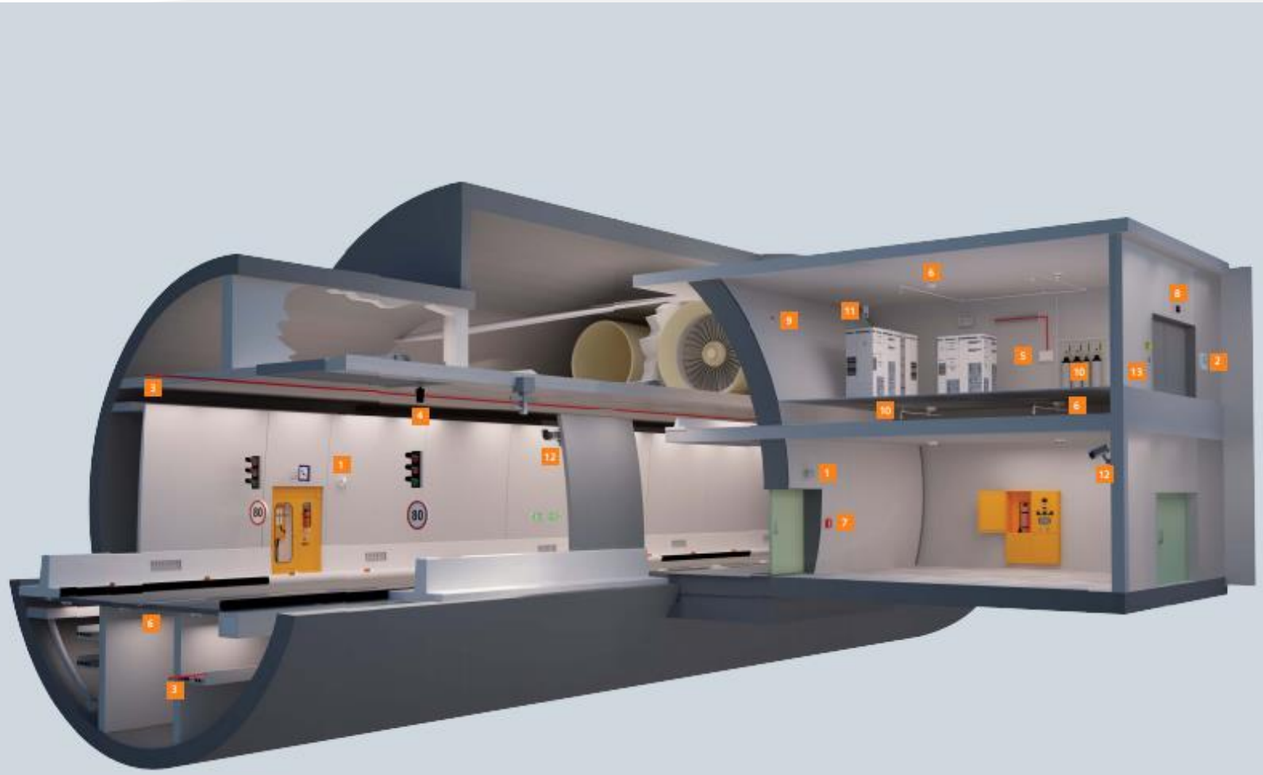
Aspirating smoke detectors enable early and reliable detection of fires in highly ventilated zones; they can be positioned in the technical room or at air intake points inside the tunnel to prevent external environmental conditions (e.g. smoke caused by fires of criminal origin) to affect the continuity and safety of the traffic through the tunnel.

Point type fire detectors 6

Sinteso S-LINE detectors are based on the **ASA**(technology™ developed by Siemens. The range includes optical, thermal, and combined fire detectors (e.g. for rooms containing electrical cabinets), a multi-sensor model for smoke, heat and carbon monoxide (e.g. for shelters), and EX models (e.g. for use in the emergency power supply storage room).

Manual call points 7

For immediate manual actuation of an alarm, manual call points are placed along the exit routes.



Alarm indicators 8

In the complex environment of tunnels and technical rooms, alarm indicators ensure that the danger area is immediately identifiable even if the detector in alarm status is not visible.

Sounder and sounder beacons 9

Sounder and sounder beacons provide both acoustic and optical alarms, ensuring that tunnel users and staff are immediately alerted even in noisy environments such as in shelters or in the tunnel tubes.

Extinguishing with Sinorix™ CDT N_2 10

For outstanding and rapid extinguishing. This technology is widely used in data centers and therefore ideal for tunnel technical rooms: the nitrogen-based agent is harmless to people, the environment, and the electrical infrastructure. The unique constant discharge technology employed ensures minimum overpressure and turbulences, reducing the risk of further damage to critical systems.

Input/output modules

For the connection with potential-free contact, used to acknowledge or activate technical states (e.g. door, ventilation, portable fire extinguisher).

Intrusion detection 11

Detection of unauthorized entries into the technical rooms with comprehensive intrusion detection systems. Scalable systems with powerful alarm management tools, high immunity to false alarm, and integration with video surveillance and access control systems.

Automatic incident detection 12

Video surveillance inside the tunnel and the technical room. Automatic incident detection inside the tunnel using Siveillance™ technology: this universal video application generates events when user-defined safety and security rules are violated. Video streams can be analogue (CCVS), video over IP or pre-recorded MPEG4 and AVI files. PAL and NTSC supported.

Control center

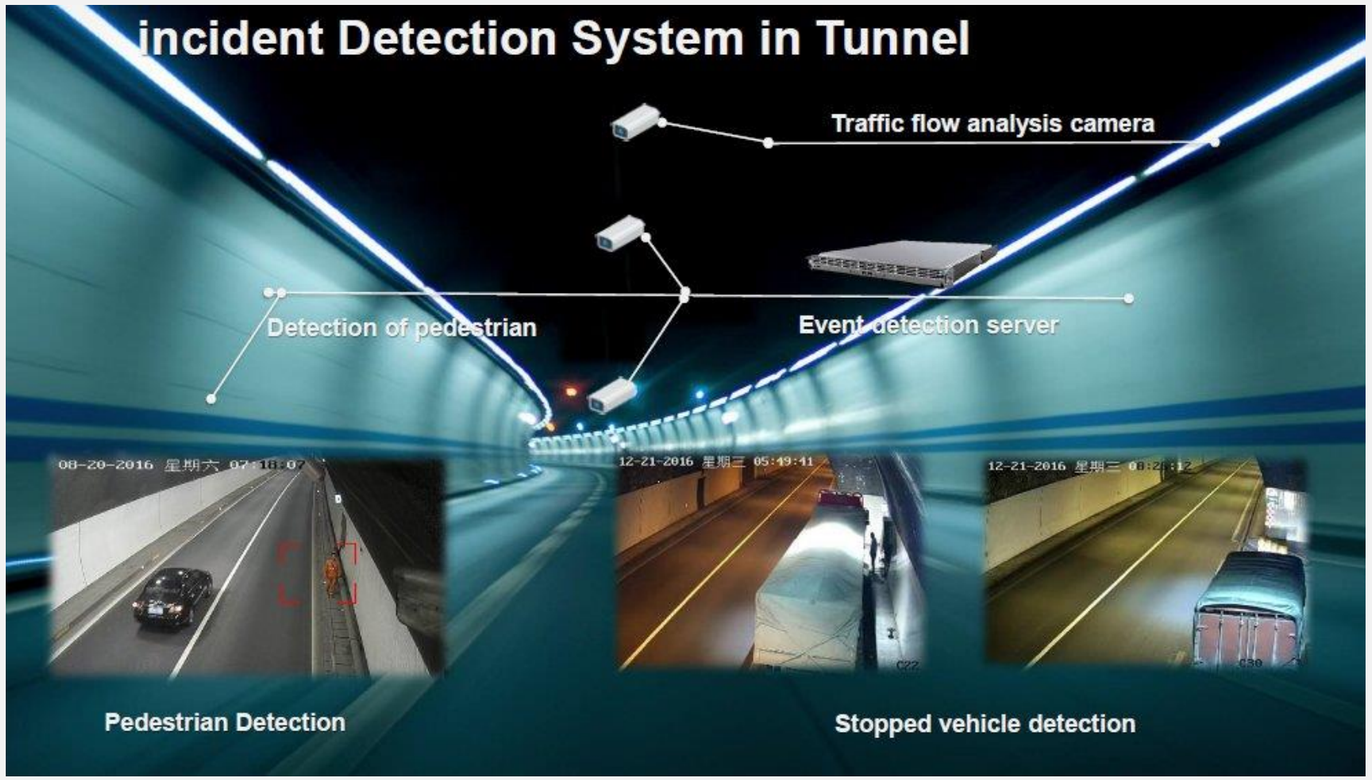
The CCC Tool Siemens caters for tunnels of all types and sizes, allowing not only the traffic guidance and control equipment, but also the light, air, and power supplies, the fire detection systems, pollution measurement, or emergency call systems to be centrally managed. Integration takes place at automation level for increased redundancy and reliability.

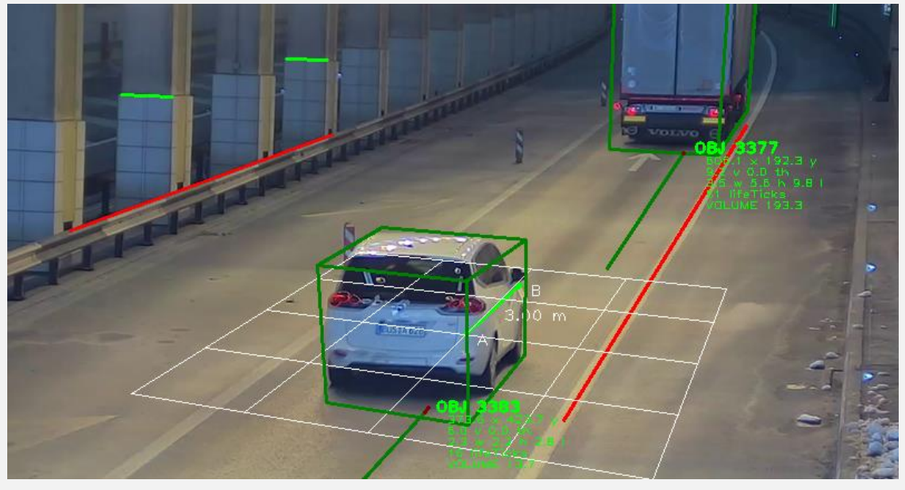
Access control 13

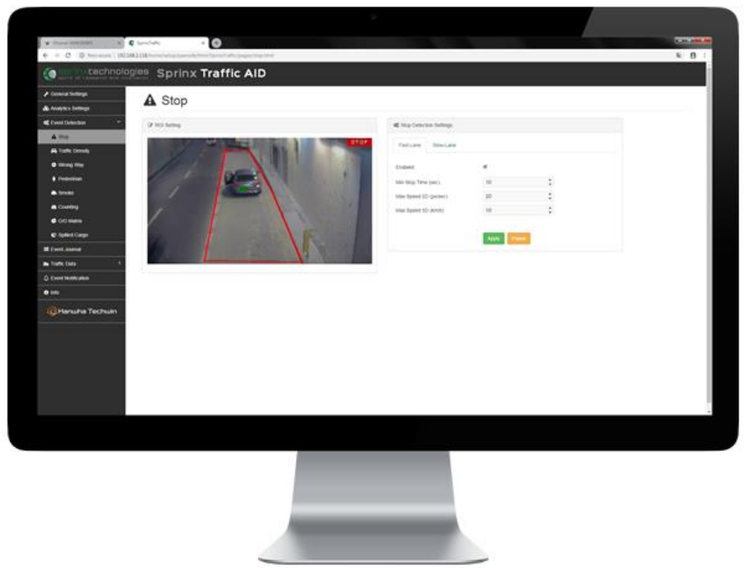
The target of Siveillance Access control systems provides a very high level of security without compromising convenience. Access readers at the technical rooms' doors restrict access to critical systems to authorized personnel. Siveillance systems integrate in existing IT environments and support advanced multi-site identity management, remote connectivity, and integration with video surveillance and intrusion detection.

Tunnel Management
Field level

- Video monitoring
- Automatic Incident Detection (A.I.D.)

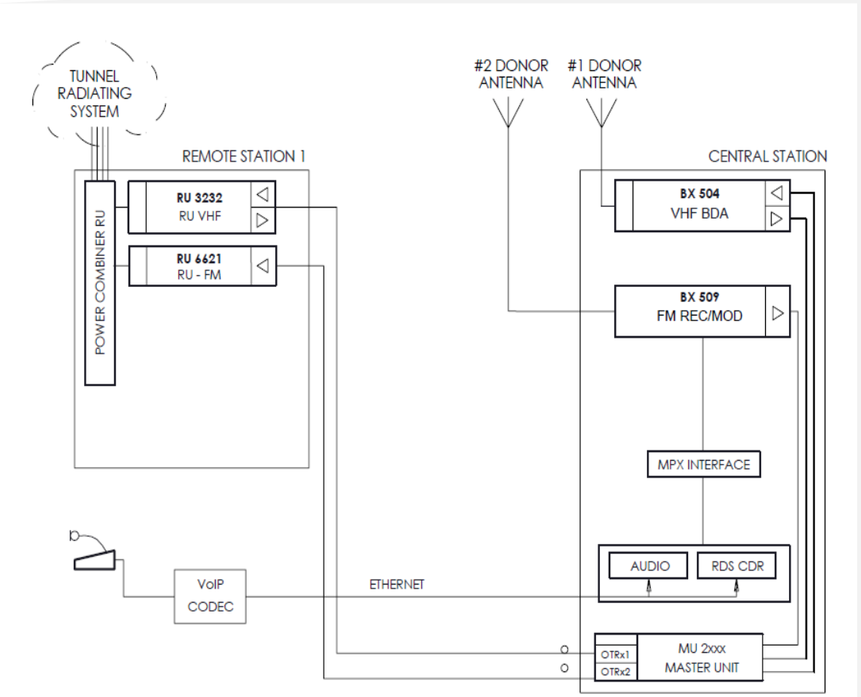


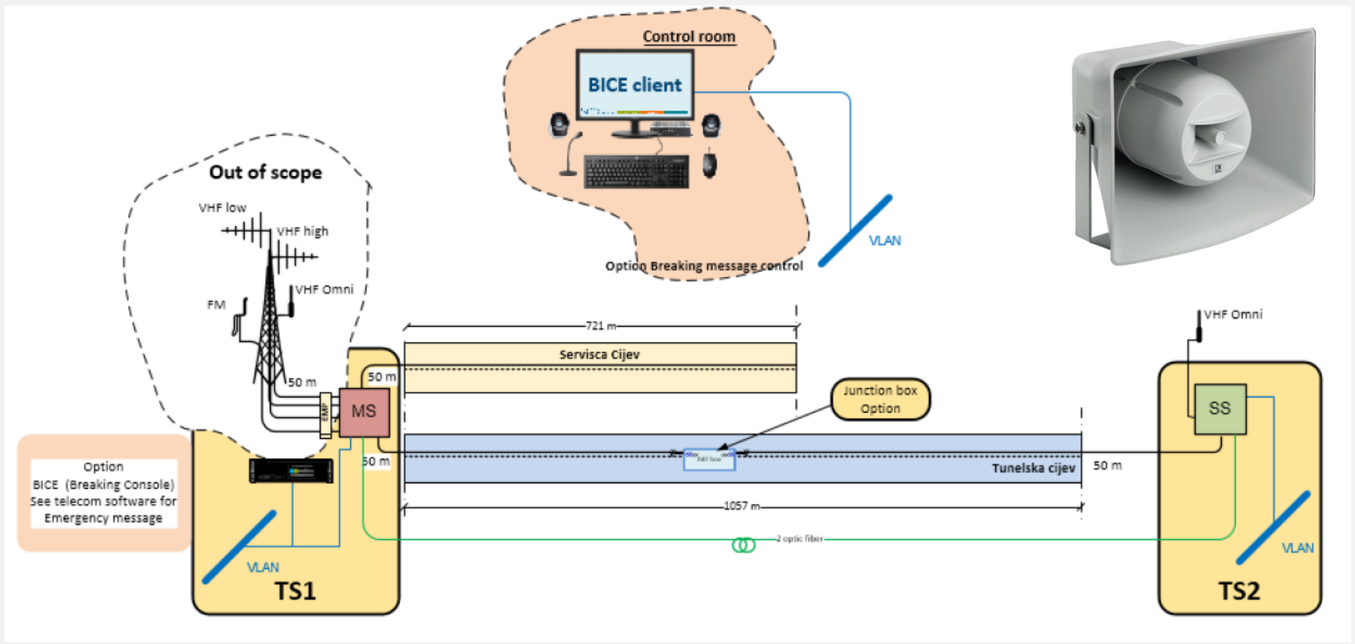




Tunnel Management
Field level

- Radio and communication system
- Sound system



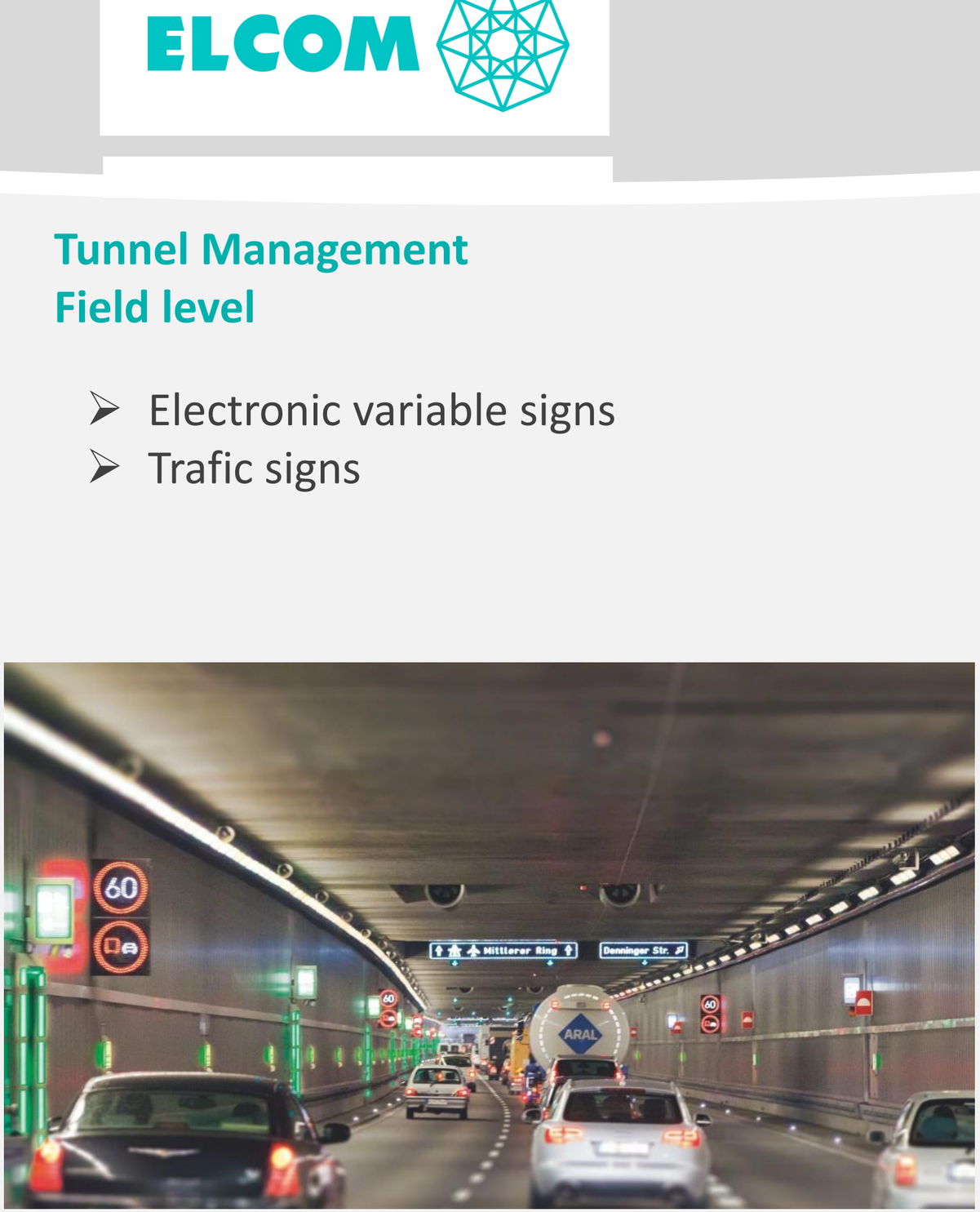


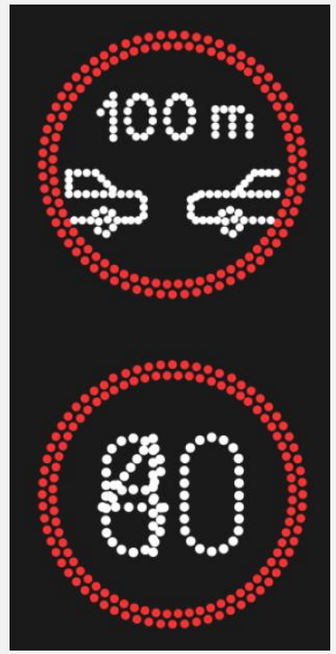
Tunnel Management
Field level

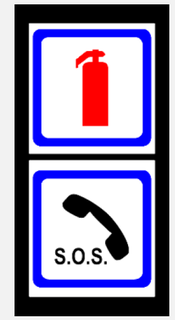
SOS System

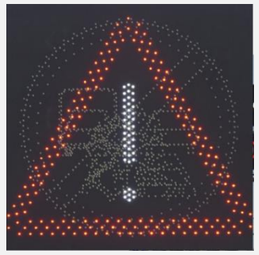
Tunnel Management
Field level

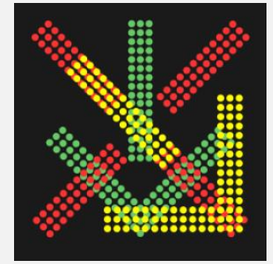
- Electronic variable signs
- Trafic signs





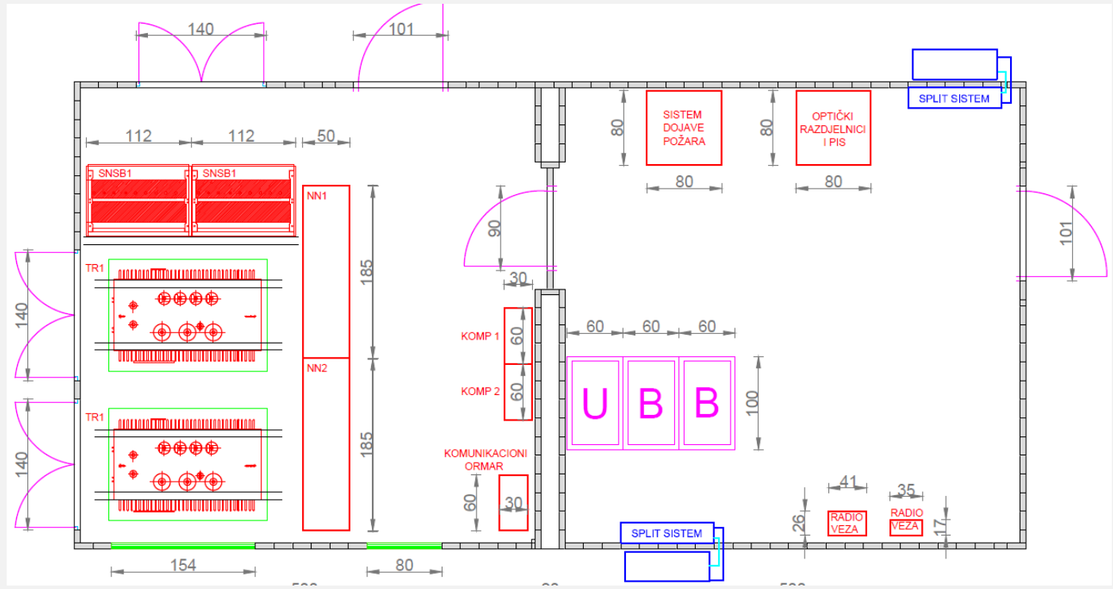


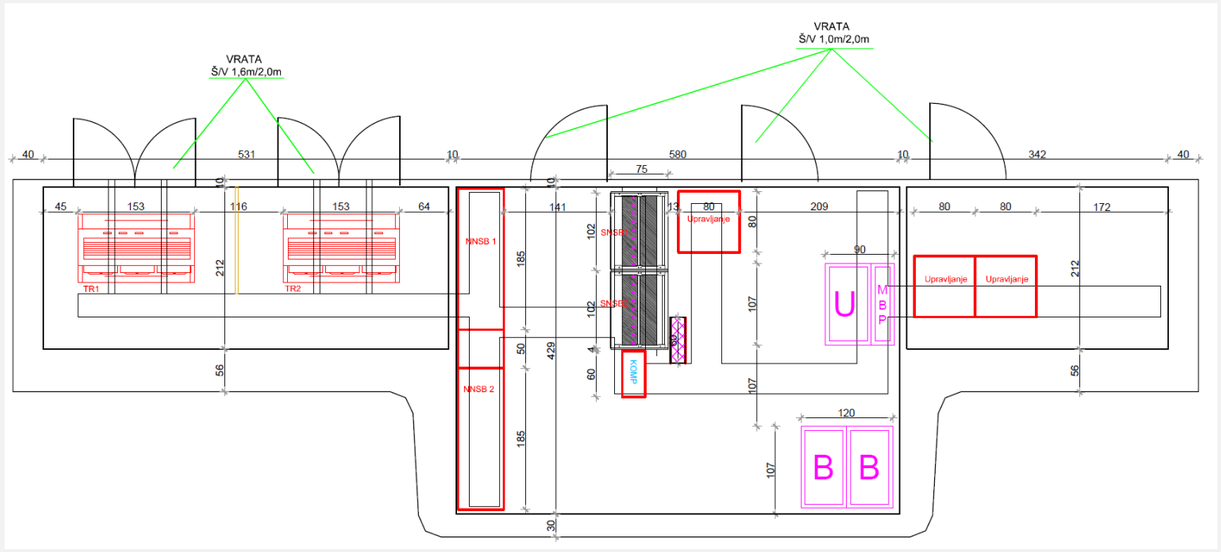




Tunnel Power Supply

- Transformer substation 10(20)/0,4 kV
  - ❑ 250 kVA
  - ❑ 400 kVA
  - ❑ 630 kVA
  - ❑ 1000 kVA

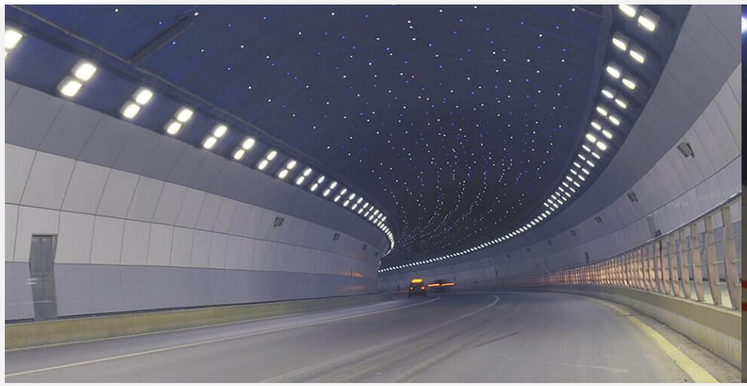


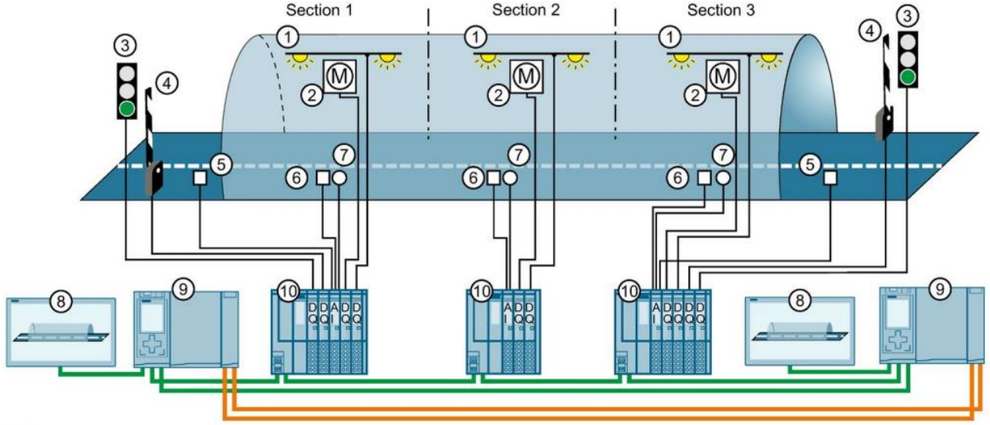


- Outside Transformer substation
- Inside Transformer substation

Tunnel Power Supply

- Lighting
  - ❑ Led Vision
  - ❑ Schreder

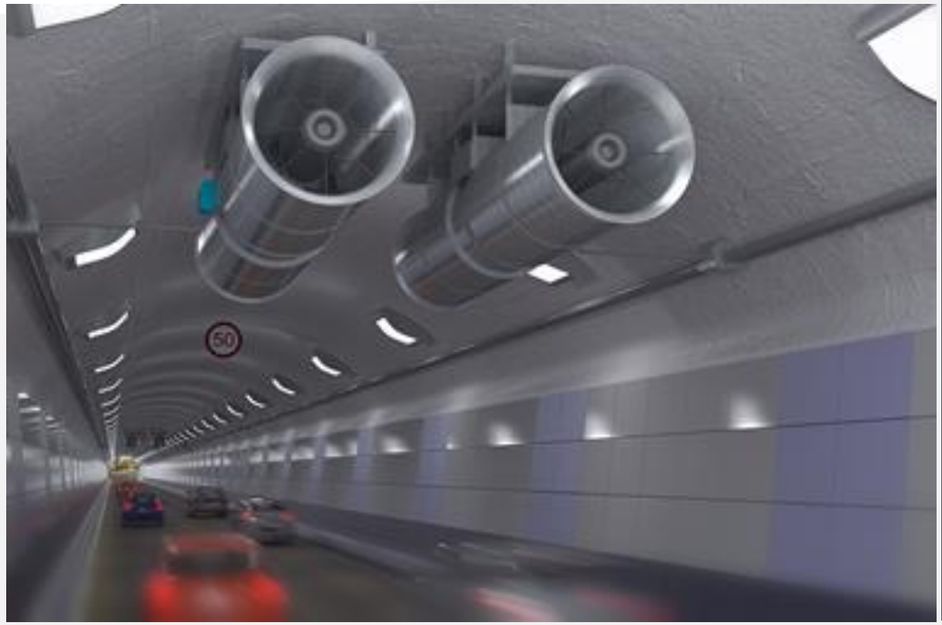


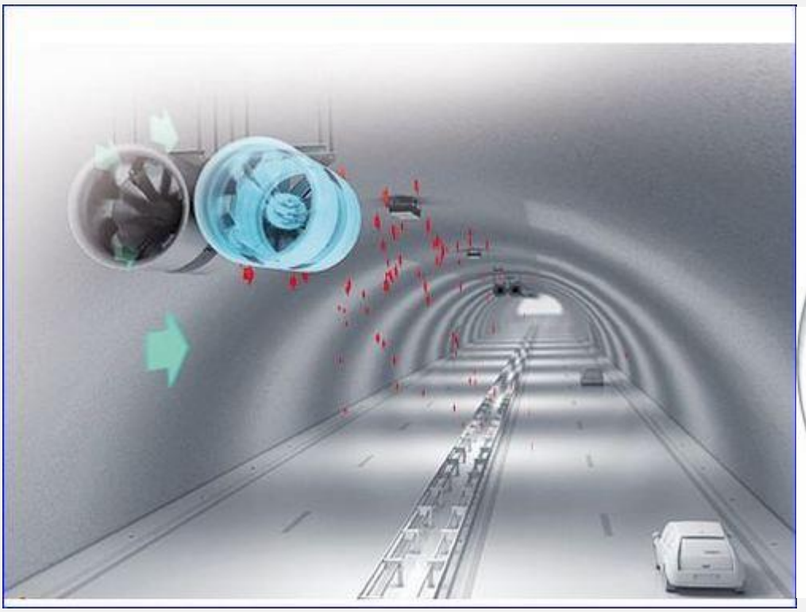


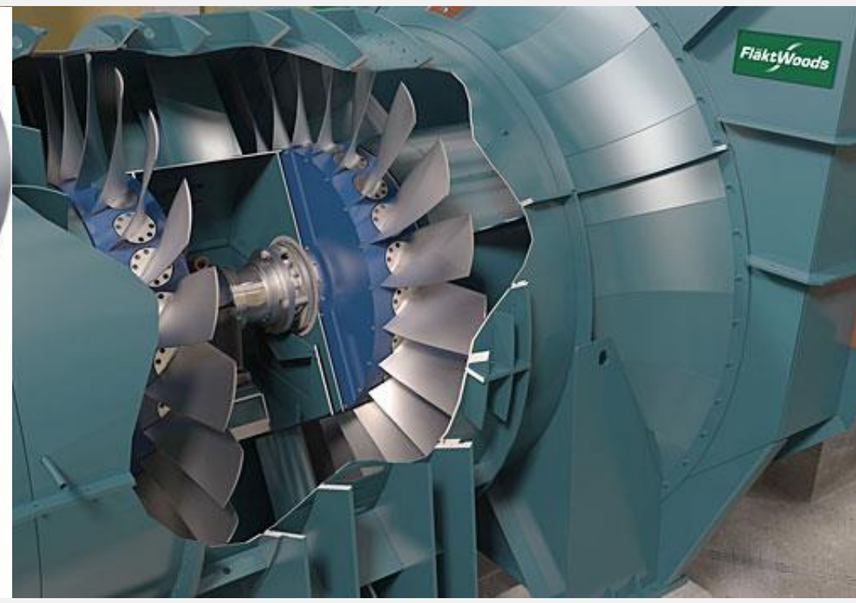
①	Tunnel lighting
②	Fan
③	Traffic lights
④	Barriers
⑤	Outdoor light sensors
⑥	Turbidity sensors
⑦	Air-quality sensors
⑧	HMI devices
⑨	H-CPUs
⑩	IO devices for tunnel sections 1 to 3

Tunnel Power Supply

- Ventilation
  - FlaktWoods
  - Sinamics
  - Sirius







Traffic management

- Controllers
- Traffic signal
- Smart detector
- Enforcement and tolling solution