COMMEND

TUNNEL SAFETY

Emergency call and alarm management for tunnels

![commend]

ALARM

COORDINATE

INFORM

SECURITY AND COMMUNICATION

Safety solutions for tunnels

THE PLATFORM FOR OPTIMUM ON-SITE SUPPORT

Whether they run overground or underground to bypass obstacles, road tunnels are not just tubes leading through mountains, bedrock or under the seafloor. They are exceedingly complex constructions with a heart of high-tech architecture. However, it's not just the tunnels' construction technology that is impressively sophisticated but also the equipment required to maintain them and – much more importantly – to make them safe and secure.

Any incident sets off a race against the clock that can only be won with immediate decisive action. Communication in these situations is crucial and often life-saving. Rescue services and motorists must be kept up to date on the situation as it develops, affected persons must be taken care of, and the tunnel area must be evacuated as quickly as possible. There is no time for repeated explanations made necessary by the unfavorable tunnel acoustics. Commend's special solutions for tunnel communication are centered around a precision-tailored emergency and threat response management, which helps to prevent the worst.

From gates and shutters at the tunnel portals to Emergency Call Stations, from noise sensors to loudspeakers and amplifiers that are tuned specifically to the tunnel's acoustic profile, everything is brought together for easy, transparent overview and user interaction at the Control Desk. The entire configuration is designed to serve the three essential needs for tunnel communication: alert – inform – coordinate. This is where the Commend Security Communication System excels, as it integrates seamlessly with overarching tunnel controls such as ventilation systems, lighting, traffic signage, fire points and video surveillance. Our wide selection of standards-based, customisable interfaces helps to ensure problem-free operation both on-site and via off-site remote control. This allows Commend systems not just to support everyday uses but also to enable helpers win the race against the clock in case of an emergency evacuation.

Security staff have a carefully selected set of support functions at their fingertips. Whether it's communication via Emergency Call stations, public address announcements, patched connections to rescuers' mobile radio networks, or even direct connections to car radio receivers – every aspect is catered for and designed to comply with statutory norms and safety standards. After all, safety always has the right of way – even inside a road tunnel.

ROAD TUNNELS

This type of tunnel is usually found on motorways or similar roads. Its main purpose is to provide direct routes across natural obstacles such as mountains, rivers or channels. Motorists receive relevant information, warning and instruction announcements via public address announcements, emergency help points or audio broadcasts fed directly to car radios. In case of an emergency, vehicles in front of the tunnel portal must be warned and prevented from entering. Depending on the situation, the seamless interplay of all safety systems and components can be life-saving.

OVERGROUND AND UNDERGROUND RAILWAY TUNNELS

One of the main purposes of this type of tunnel is to eliminate steep climbs for rolling stock in mountainous terrain. Underground railways in densely populated urban areas also use tunnels to keep distances short and travel times down. Here, too, communication is crucial, whether it's enabling information announcements or providing emergency call points or central control for escape route lighting, CCTV cameras and the like. Where escape tunnels are available, they too need appropriate emergency call and public address facilities.

PEDESTRIAN TUNNELS

These tunnels are intended primarily to provide a safe underpass for pedestrians on their way to an underground railway station or garage, for example. The key here is to provide a reassuring environment. This includes security equipment, e.g., emergency audio/video stations with features such as emergency/distress sound detection and direct loudspeaker connections for bi-directional communication with staff at the security desk. Additional music feeds can also help to provide a comfortable atmosphere and avoid panic situations.

Light at the end of the tunnel

SECURITY AND EMERGENCY COMMUNICATION SUPPORT BY COMMEND

With its Intercom system Commend offers an audio-based monitoring and security platform for everyday applications that also ensures assistance in distressing or emergency situations. Motorists in need of assistance are instantly put through to the service desk at the push of a button to receive personal assistance. If an emergency strikes, a central control station, unlimited site networking, and easy integration of third-party systems make it easy for operators to monitor the situation and keep things under control.
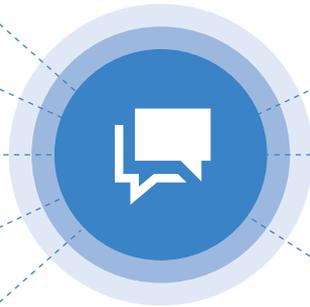
Ensures safety and protection for people

Keeps buildings and technology safe and sound

Supports security and rescue services
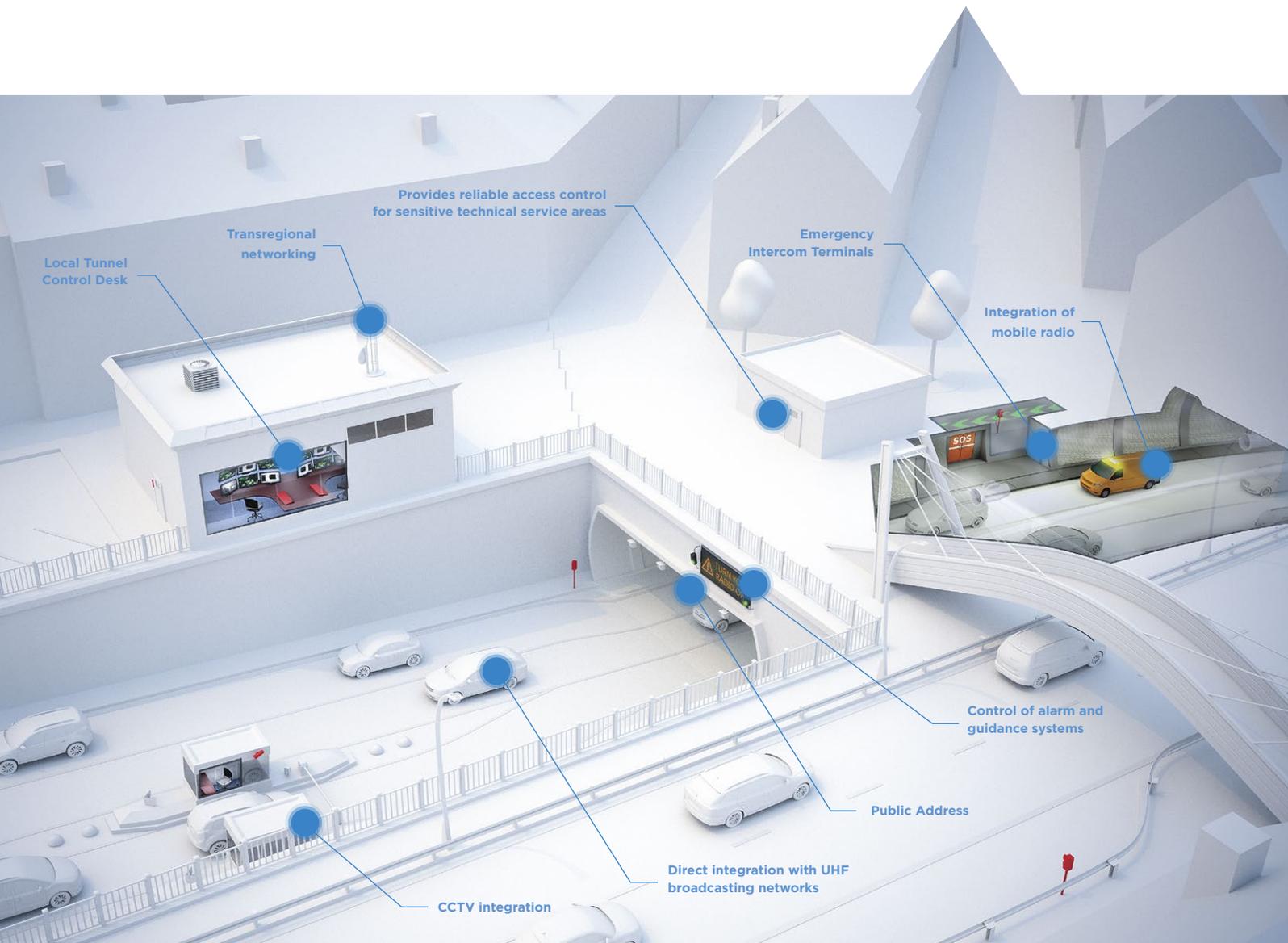
Smooth workflows

Supports employees in their everyday work

Uniform communication platform

Cyber-secure communication

Enables staff to respond and act quickly in any situation

Provides reliable access control for sensitive technical service areas

Transregional networking

Local Tunnel Control Desk

Emergency Intercom Terminals

Integration of mobile radio

Control of alarm and guidance systems

Public Address

Direct integration with UHF broadcasting networks

CCTV integration

SCADA

VirtuoSIS

Intercom Server

WinControl Server

Tunnel-specific Amplifiers

Signal Manager

Tunnel-specific Loudspeakers

IP-PA loudspeakers for passages, airlocks and safe rooms

Integration of third-party systems (video, VMS, BMS, etc.)

Monitoring inputs, controlling outputs

Audio & communication control

Local overview and control

Emergency and Threat Response System (ETRS)

Emergency call support for tunnels

Access control

ONE
Platform

SOS

Public Address, alarms, announcements, ...

Communication for offices, technical services, etc.

Mobile communication

Control Desk systems with functions for audio recording, event logging, etc.

Tunnel/Emergency Call Stations

Intercom stations for doors and control points with Emergency Mode

Wall-mounted Stations

Integration with telephones, PBX system call forwarding, public telephone networks

Mobile radio

Smartphone apps

NETWORKING

Multiple sites (tunnels and/or local control desks) can be networked and managed from a central location.

CONNECTING ALL AREAS

A tunnel is an integrated part of a complex overall facility and as such should not be isolated. Commend solutions helps to keep the essential tunnel areas connected to the 'outside world'. From machine rooms to administration buildings, staff are able to keep in touch and exchange essential information and instructions over reliable connections. Companies can benefit from Commend solutions in a number of ways.

SOS

Tunnel Emergency Call Stations ensure compliance with legal requirements

Intercom stations at tunnel entrance and exit points

Door Intercom stations for pedestrian access points, machine rooms, etc.

Access control for security critical areas

and many more

Round-the-clock help at the push of a button

Vehicle breakdowns and traffic accidents are particularly dangerous when they happen in a tunnel. Constant exposure to noise, dust and moisture don't make things easier. For constructional reasons, Emergency Call stations cannot always be installed behind soundproof doors. Also, seeping water and regular exposure to tunnel cleaning equipment require all technical components to be absolutely waterproof. Commend Emergency Call Stations are designed specifically to withstand these and other environmental influences to ensure ultimate fail-safety under any conditions.

INSTANT CONNECTIONS

Much faster than any other system (e.g., telephones)

ALWAYS AVAILABLE

Automatic function monitoring for all system components (loudspeakers, microphones, communication/data lines, etc.)

DURABLE DESIGN

Stainless steel front panel, poke protection and sabotage detection contacts

PERFECT SPEECH INTELLIGIBILITY

Intelligent Volume Control (IVC) automatically adjusts the volume setting to ambient conditions.

DYNAMIC BACKGROUND NOISE SUPPRESSION

ensures optimum speech intelligibility even if there is loud traffic noise in the background.

HANDS-FREE COMMUNICATION

Users can make calls to the Control Desk without the need to keep pressing a call button. This makes things easier for them in stressful situations.

EVERY CALL GUARANTEED TO GET THROUGH – 24/7

Ultimate fail safety under any conditions, thanks to durable design and permanent self-monitoring.

ANNOUNCEMENTS – INDIVIDUAL, AUTOMATIC OR BOTH

In addition to making live announcements, it is possible to play back pre-recorded announcements at the push of a button.

PERFECT SPEECH QUALITY

Background Noise Suppression, Intelligent Volume Control (IVC) and 16 kHz audio quality (covers entire human voice sound spectrum)

STRONG PROTECTION

Protected against vandalism by a 1.4571 grade stainless steel front plate, a poke protection mechanism, special tamper-proof screws and sabotage detection contacts.

DESIGNED TO MEET ANY REQUIREMENT

Extensive range of Intercom station models, including custom tailored stations that meet national requirements and regulations.

VANDAL-RESISTANT HANDSET

Clear communication even of loud ambient traffic noise without an emergency call box. An call is initiated when the handset is removed from the rest.

EMERGENCY CALL STATION

2-wire and IoIP Intercom stations with clearly visible orange coloured (RAL 2004) stainless steel front panel.

EMERGENCY CALL STATION WITH HANDSET

2-wire and IoIP Intercom stations with clearly visible orange coloured (RAL 2004) stainless steel front panel and vandal-resistant handset.

EMERGENCY CALL STATION WITH HANDSET

Full Duplex enabled SIP stations with stainless steel front panel and vandal-resistant handset. Designed to meet EU requirements.

EMERGENCY CALL STATION

IoIP Intercom stations with clearly visible orange coloured (RAL 2004) stainless steel front panel, side impact protectors and durable polycarbonate casing.

EMERGENCY CALL STATION WITH ROCKER LEVER

IoIP Intercom stations with clearly visible orange coloured (RAL 2004) stainless steel front panel, side impact protectors and durable polycarbonate casing.

INTERCOM STATION WITH HANDSET

4-wire Intercom station with handset, IP 65 rated; automatic call initiation when handset is lifted up.

Emergency Threat Response System (ETRS)

INSTANT EMERGENCY RESPONSE

Disruptions or emergencies ranging from harmless to life-threatening – in busy traffic environments there is danger lurking everywhere. Whether it's caused by human error or a technical fault, **an emergency calls for instant, professional help, as every second counts**. Communication systems by Commend raise alarms and provide an overview of the situation. They initiate essential processes, support the supervisor and establish communication connections to internal and external support and rescue services.

PREVENTION

Clear, easy communication without misunderstandings helps to prevent accidents.

ALARMS

SAVING TIME

Emergency calls can be made quickly and easily using Intercom stations, push-buttons or mobile devices, either manually or automatically (e.g., via sensors).

VERIFICATION

RESPONDING QUICKLY

Control Room staff can keep an eye on things, thanks to on-screen visualisations and
video displays. Alarms can be verified via voice communication to eliminate costly false alarms.

RESPONSE / DE-ESCALATION

REACTING CORRECTLY

Instant connections to internal and external intervention and rescue services for exchanging essential information

ACTION PLAN

A CLEARLY LAID-OUT ACTION PLAN HELPS TO KEEP STRESS LEVELS DOWN.

The solution supports Control Centre staff in following action plans designed for dealing with emergency scenarios. This helps to keep stress levels down ans allows staff to focus on following the correct response procedures.

ACTION SEQUENCE

THE REQUIRED SEQUENCE OF ACTIONS DEPENDS ON THE SITUATION.

The system can perform a series of automatic actions in a pre-defined sequence.

– Announcements issued to individual public address zones based on pre-recorded audio messages (with option of feeding announcements directly to the UHF radio network)

– Control of equipment such as doors, barrier gates or lighting

– Intercom stations with displays switch to Emergency Mode and show instructions in accordance with a pre-defined emergency plan (escape routes, meeting points, etc.).

– Activation of visual and acoustic alarms

ANALYSIS AND EVALUATION OF EXISTING ACTION CONCEPTS

The Commend system can create a seamless log documenting each event. If required, it can also record all calls and corresponding video streams. This enables a detailed analysis and an impartial review of the events. Staff are informed immediately about what has happened, who responded and how fast. Based on this information, existing response action plans can be evaluated and revised to include preventive measures for the future.

In the event of a worst-case scenario where people are injured, official investigators will verify if everything humanly possible has been done to avert danger and to minimise damage. With the Commend solution, operators can document that they have taken appropriate measures and that an adequate risk management is in place.

AVOIDING ACCIDENTS THROUGH ENHANCED INFORMATION

MORE SAFETY FOR STAFF AND TUNNEL USERS

RESPONDING QUICKLY AND APPROPRIATELY IN AN EMERGENCY

HELPS TO MINIMISE DAMAGE IN CASE OF ACCIDENTS

CLEAR INSTRUCTIONS, CLEAR COMMUNICATION

EMERGENCY AND THREAT RESPONSE SYSTEM (ETRS)

Your assistant for overview and control

HEARING, SEEING AND RESPONDING PROPERLY AT THE CONTROL DESK

The Control Desk is the first point of contact – a security hub where all lines converge. It is the main point of **coordination, monitoring and supervision**. Fortunately, your staff won't have to rely on their ears alone. Commend's visualisation-based solutions with on-screen floor plans and video displays allow them to assess the situation quickly and accurately. In case of an emergency help call, the Commend Emergency Threat Response system is standing by to assist staff in taking the necessary steps. If required, they can do so by following a pre-set action plan, which allows several actions to be performed automatically.

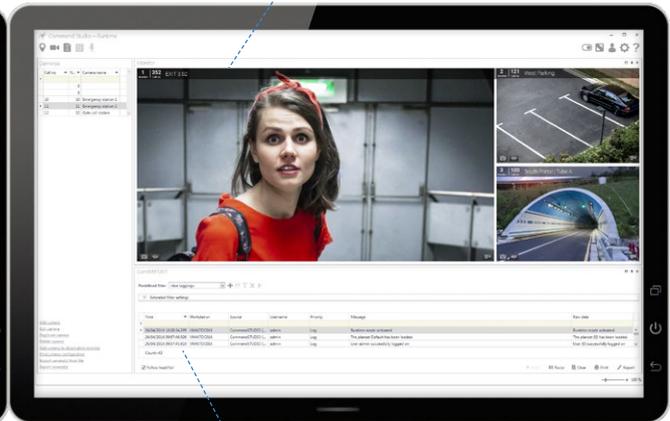| Visualisation	Video integration	Logging	Audio recording	Time-scheduled planning and control
ComWIN	ComVIDEO	ComREPORT	ComREC	ComSCHEDULE

PLANS, ICONS AND BUTTONS

– Tunnel constructions and related zones/tubes are visualised on 3-D/2-D on-screen plans. Icons represent the various system components. Speed buttons provide instant access to functions for call initiation, announcements, video display, etc.

– Incident locations can easily be identified on floor plans with the help of informative icons. Maps and plans relevant to the incident are presented to staff automatically to help them focus on the most urgent events first.

VIDEO
Automatic display of single or multiple video sources to complement voice calls.
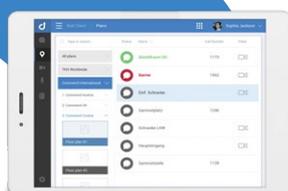
PLAN NAVIGATOR

ANNOUNCEMENTS AND PUBLIC ADDRESS

– Live announcements and pre-recorded messages can be targeted to specific zones.

– Dynamic announcements at a click of the mouse pre-recorded voice messages can be combined as needed to suit individual situations.

– Announcements can also be scheduled for play-back at specific times.

SYSTEM LOGS AND REPORTS

– All system events are logged for further processing and evaluation.

– Whether at their desk or on the go, users can easily monitor, filter and analyse Intercom system events and transaction data in real time.

CONTROL DESK FOR STAFF ON THE GO

Thanks to the Web Client, there is no need to configure device software locally. All the required data can be accessed in a flash using just a notebook or tablet with a browser. This way, staff can answer calls without delay, forward them as necessary, add live video connections to audio calls, and control third-party equipment such as alarm systems or ventilation equipment.
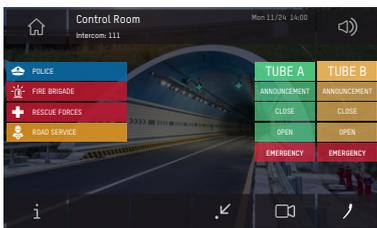
Duetto

FLEXIBLE AND VERSATILE

Duetto supports users in handling calls, putting all relevant functions at their fingertips. Incoming voice calls are complemented by live video and CCTV images.

Custom configurable user interface

Using the web interface you can easily arrange and adjust the user interface to support you in your everyday work. Custom configure your own GUI layout, place direct dialling buttons where you need them, and put all your frequently used functions at your fingertips.
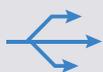

Integrated video camera

IP (IoIP°/ SIP)

Optional handset
Connection port for a headset

Smart and compact
Touch screen for fast access to features and functions (making calls or Public Address announcements, or using controls)

FLEXIBLE CALL FORWARDING

In case the central control station is unattended or unavailable, incoming calls are forwarded automatically in a pre-defined order of priority (Intercom stations – telephones – mobile devices). Calls can also be forwarded to multiple recipients simultaneously to ensure they are answered as quickly as possible.

CONTROL DESK EE 900

– Compact design
– Optional handset
– Versions with gooseneck microphone
– IP (IoIP°)

CONTROL DESK EE 380

– Modular design – the base unit can be enhanced with an add-on gooseneck microphone, handset, additional loudspeaker, and up to four direct dialling modules.
– Direct dialling modules with multifunctional LEDs for status indication
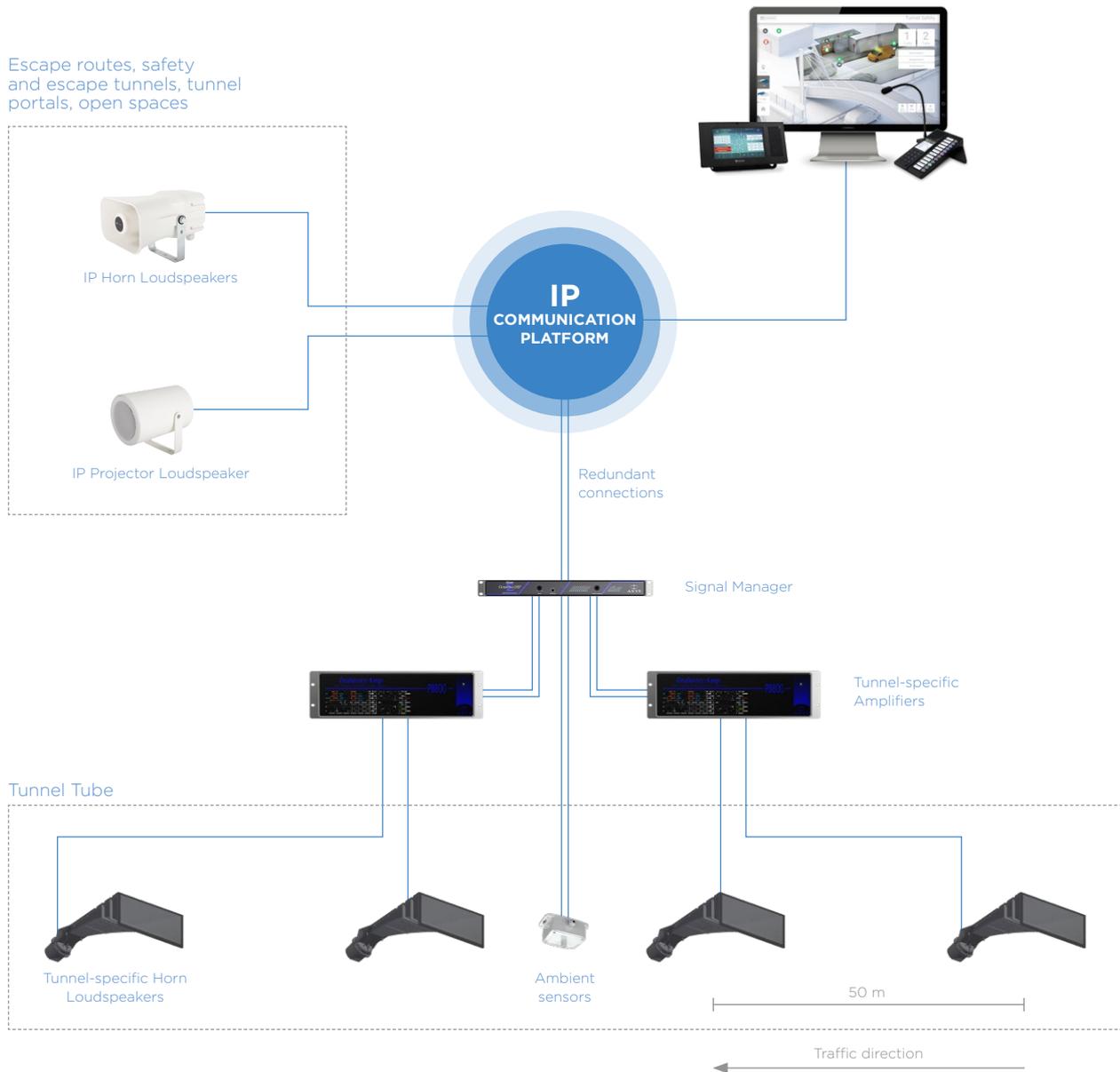– Digital

CONTROL DESK "CONDUCTOR"

– Modular design – the base unit can be enhanced with an add-on gooseneck microphone, handset and up to three direct dialling modules.
– Direct dialling modules with multifunctional LEDs for status indication
– TFT video display
– IP (IoIP°)

Information that's loud, clear – and well received

PUBLIC ADDRESS SOLUTIONS FOR TUNNELS AND OPEN SPACES

Commend Public Address solutions enable a reliable, targeted communication of information and warnings, from tunnel evacuation instructions and safety notifications at the tunnel portal to the ability to page individual persons. In an emergency, Commend Public Address solutions are an easy, reliable way to issue alarms; in extreme cases they also support evacuation procedures. Relevant information must reach all relevant areas loud and clear to warn all affected persons in time to protect their health and lives.

Escape routes, safety
and escape tunnels, tunnel
portals, open spaces

IP Horn Loudspeakers

IP Projector Loudspeaker

IP COMMUNICATION PLATFORM

Redundant connections

Signal Manager

Tunnel-specific Amplifiers

Tunnel Tube

Tunnel-specific Horn Loudspeakers

Ambient sensors

50 m

Traffic direction

SIGNAL MANAGER
AXYS˙ Octadrive DSP

– The ideal interface for connecting amplifiers to Audiomatrix
– High-performance signal processor
– DSP functionality
– 16 × 8 Audiomatrix
– Remote monitoring of the DSP, loudspeakers, internal ventilator, microphone, etc.
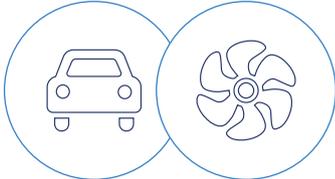
TUNNEL-SPECIFIC AMPLIFIER
AXYS˙ PB400 / PB800

– 4-channel (PB400) and 8-channel (PB800) versions
– Powerful DSP ensures optimum signal processing
– For centralised and decentralised operation
– Redundant network connections
– One channel per Tunnel PA loudspeaker
– Permanent line monitoring

TUNNEL-SPECIFIC HORN LOUDSPEAKER
AXYS˙ ABF-260/100W

– Special tunnel-specific loudspeaker
– Compensates phase shifts between direct and reflected sound
– Power: 100 W / 100 V
– Max. sound pressure: 119 dB (at 4 m measuring distance)

INTELLIGENT VOLUME CONTROL (IVC)

IVC uses sensors to constantly measure the volume level of ambient traffic noise and other interfering sounds. It then uses this information to dynamically adjust the loudspeakers' sound pressure. This ensures optimum speech intelligibility under any acoustic conditions.

ECHO CANCELLING

Thanks to their special design, the tunnel-specific horn loudspeakers eliminate sound reverberations caused by the tunnel's architecture, otherwise announcements would be distorted to the point of being completely intelligible.

CRYSTAL CLEAR AUDIO QUALITY

To prevent announcements from turning into a 'sound mess' due to reverberation, interposed signal managers send the audio signals to the amplifier for the carefully positioned loudspeakers at precisely timed intervals.

INTELLIGENT LOUDSPEAKERS

INTERCOM INSIDE
Loudspeaker with built-in Intercom module, individually addressable and configurable

CRYSTAL-CLEAR SPEECH QUALITY
Special features such as automatic adjustment of volume levels to ambient acoustic conditions

EXTRA-HIGH VOLUME CAPACITY
Integrated 10-Watt Class-D amplifier with PoE power supply (up to 118 dB)

BI-DIRECTIONAL PUBLIC ADDRESS
Integrated microphone for duplex and call-back functionality

INDIVIDUAL ANNOUNCEMENTS
via public address channels, including zone selection

ANNOUNCEMENTS BASED ON PRE-RECORDED VOICE MESSAGES

SUBSECTION CONTROL
Control of integrated signal outputs (e.g., traffic light systems, door actuators, etc.)

Protecting assets

ACCESS CONTROL AND PERIMETER PROTECTION

Commend system solutions have many additional talents: They support access control, reliable all-around protection for sensitive technical service areas, and the management that goes with it. Unauthorised persons are kept off the premises, which reduces the danger of industrial espionage, theft or vandalism. Commend's IP-based Public Address systems for security communication offer intelligent interaction, enabling staff to respond proactively to on-site incidents **using the system's automation features.**

Strong protection

Durable materials, a poke protection mechanism, special tamper-proof screws and sabotage detection contacts protect the Intercom stations against vandalism and manipulation attempts.

Emergency Mode

To assist rescue services in an emergency, the Intercom stations automatically guide them directly to the incident site.

EMERGENCY CALL
SOS
YOUR LOCATION
Escape Tunnel A / Exit 3

CALL FOR HELP

PREVENTS UNAUTHORISED ACCESS

PROTECTS TUNNELS AND TECHNICAL SERVICES

PREVENTS SABOTAGE AND VANDALISM

ASSISTS SECURITY STAFF

PROVIDES ACCESS MANAGEMENT AND CONTROL

OFFERS COMBINED INTERCOM AND VIDEO SURVEILLANCE

SUPPORTS WORKPLACE COMMUNICATION

HELPS TO ENSURE PERIMETER PROTECTION
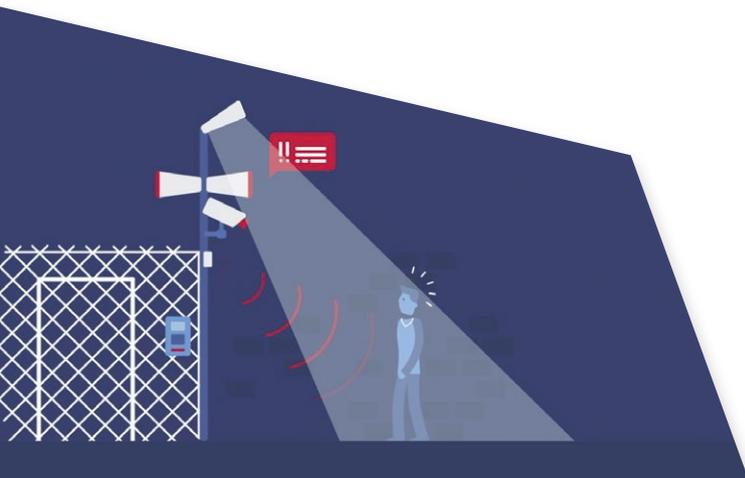
Autonomous warning system

If a person approaches the safety zone, a self-sustained, sensor-driven IP Loudspeaker issues a pre-recorded voice message.

Automatic warning announcements, lights, video

Sensor-controlled IP Loudspeakers can trigger automatic action sequences, e.g., turning on the lights, placing a call to the Control Desk and activating a CCTV camera.

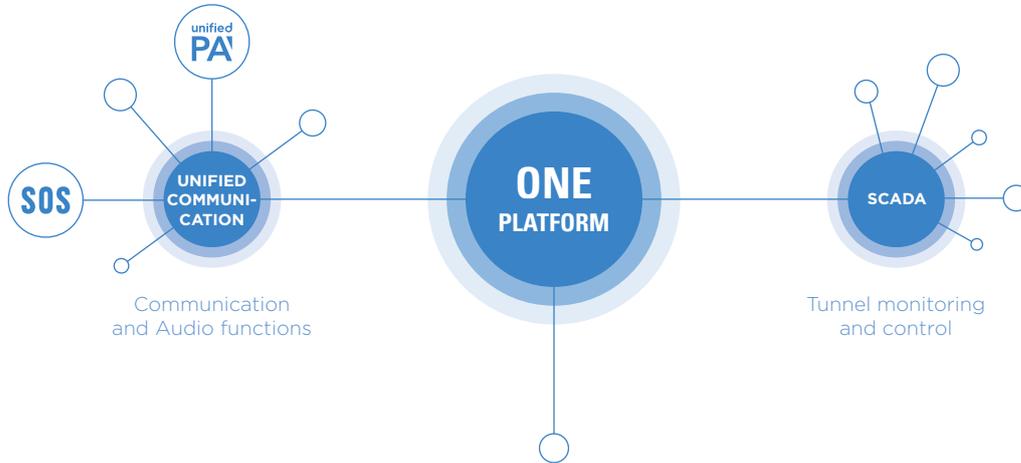### Incident localisation and proactive intervention

With each incoming call Control Desk operators are shown the corresponding site plan and live video stream on-screen. By remotely addressing the person(s) at the site directly, the operator can take proactive steps to resolve the situation.

Smart systems work together

INTERFACE TO SUCCESS

Where security and communication systems are concerned, it is essential for all components to interface smoothly. A constant exchange of data, video and audio streams allows these systems to utilise their full potential and enable perfectly integrated solutions for maximum user benefit.

unified PA

SOS

UNIFIED COMMUNI-CATION

ONE PLATFORM

SCADA

Communication and Audio functions

Tunnel monitoring and control

CERTIFIED, WELL-SUPPORTED INTERFACES

Commend Intercom systems support a variety of standards, including OPC, SIP and TETRA, DMR, Modbus, KNX, SNMP and others, offering a variety of existing, well-tested interfaces to third-party systems.

Video	Audio Public Address PAGA	Building/Tunnel Management SCADA / Modbus / KNX etc.
VoIP/SIP Servers	VoIP/SIP Telephones Analogue Telephones Mobile Telephones	Public Telephone Networks
Monitoring entrance points and controlling exit gates	Access management for barriers and doors	Digital and analogue radio systems
Signal beacons, display panels and visual alarms	Sensors	**SDK** Flexible interfaces and other third-party systems

Integrate
Interfaces and open standards allow you to integrate various different systems.

Automate
Data exchange between the systems is fully automatic. You are free to define triggers and actions across all integrated systems.

Profit
You can easily set up automated processes that help you maximise efficiency and ensure personal safety for your staff.

commend

PROJECTS

Australia – Brisbane Bypass Tunnel // **Belgium** – Frans Thijsmans Tunnel
Netherlands – Eerste en Tweede Coentunnel // **Norway** – Innfjord Tunnel
Russia – Majskij Road Tunnel in Sochi // **Switzerland** – Valle di Lei Operating Tunnel
India – Qazigund Railway Tunnel // **Tunnels worldwide** – Emergency Call Stations,
unified PA Solutions, Control Desk Solutions, ...

SECURE COMMUNICATION SYSTEMS BY COMMEND

Can you imagine a system that millions of people rely on every day, where every word has to count? That's the world of COMMEND! Secure, reliable communication is our passion. We are a global market leader with more than 45 years' experience in speech transmission. In addition to Intercom and video connections that interface with third-party systems we also provide products that open up new possibilities for integrated solutions. Commend is the preferred choice for hands-free voice communication systems all over the world.

AUSTRIA — OBSESSIVE ABOUT QUALITY

Quality tested. Reliable. Well-designed. COMMEND products are developed and manufactured by Commend International in Salzburg, Austria. Our development and manufacturing processes are certified as per EN ISO 9001:2015.

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If you want to learn more about our tunnel solutions, feel free to contact us.

commend.com