



HIGHWAYS AND TUNNELS
Transportation Solutions

Clear communication
anywhere you need it

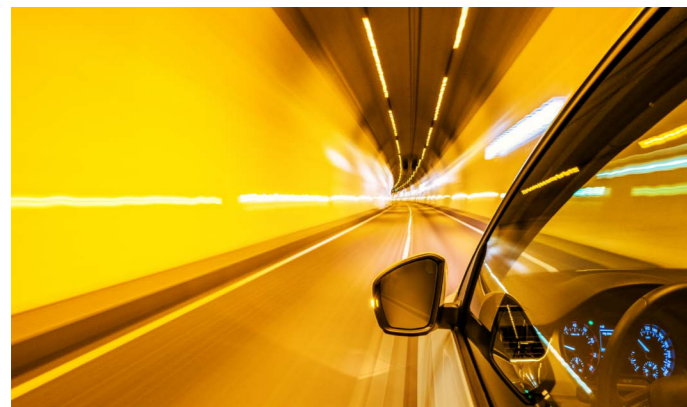
It's all about the people you protect

www.zenitel.com

Cost-Effective communication solutions.

Zenitel delivers peace of mind with reliable and robust communication solutions for road tunnels and highways. Give a crystal clear voice to your emergency communications and be sure to hear, be heard, and be understood anytime you need it.

Our communication solutions are designed to withstand the ultimate acoustics challenges. No matter how long the tunnels are, the systems deliver intelligible and clear speech when it matters most.



Smart Design. Cost-effective Solutions.

Zenitel offers highly efficient and modular audio communication solutions that are both power-dense and cost-effective. These solutions are designed to optimize space utilization, making them ideal for installations where space restrictions are common, such as in tunnels.

Our PAVA (Public Address and Voice Alarm) solutions provide flexible mounting options, including typical rack or wall mounts. This versatility ensures quick and easy delivery, simplifying the installation process and enabling efficient deployment of the communication system.



Robust and Reliable

Zenitel understands the unique acoustic and environmental challenges that arise in tunnel and open air installations. Our solutions are meticulously engineered to endure the harsh conditions commonly encountered in these environments, including high levels of dust, humidity, moisture, and temperature fluctuations. Even in highly reverberant areas like concrete tunnels, our solutions ensure clear and intelligible communication.

Equipped with realtime fault monitoring and built-in redundancy, our communication solutions ensure 24/7 operations with nearly zero downtime.

We are trusted around the globe

Túnel de la Línea
Colombia

Tunelový Rozhlas,
Slovakia

Hornberg Tunnel,
Germany

Pragtis Midan Tunnel
India

Empower your communication potential with Zenitel

Clear communications in the noisiest and most challenging acoustic environments

Zenitel's audio communication solutions are designed to deliver exceptional sound quality in tunnels and highways toll booth, and our extensive range of reliable products and solutions ensures that safety is never compromised in these critical applications.

With a combination of application-specific speakers and Zenitel's advanced DSP Processing, and precise time delays, our systems are optimized to provide optimal performance in each unique environment.

Compact and flexible installations to lower your costs

Zenitel systems help to reduce the amount of cabling needed, lowering overall costs, with the option to implement a distributed system with amplifiers placed closer to the loudspeakers.

Lower installation costs and a considerably smaller footprint than a typical 19" rack, yet extremely powerful makes Zenitel's powerful but compact wall-mount INTEGRA PAVA system ideal for tunnels where installation space is at a premium.

We offer both centralized and distributed solutions for Voice Alarms, Public Address systems and Intercom points, tailored to meet the special needs of your installation.

Our tunnel solution is optimized for modern construction methods where the tunnels are prefabricated in sections and assembled on-site. Zenitel Integra PAVA solutions can be easily pre-installed in each section and seamlessly integrated into a single system when deployed on-site.

Around-the-clock operations. Virtually zero downtime

Equipped with dual power supply, dual Ethernet port, hot-swappable amplifier modules and hardware bypass mode, our systems offer enhanced redundancy. This redundant architecture, combined with cutting-edge technology, ensures that your operations remain uninterrupted and maintenance-free.

In addition, Zenitel's iVENCs PA Control System provides comprehensive control and monitoring of all audio assets within the tunnel. It offers automated and manual control over PA. With iVENCs, you can efficiently manage and monitor the tunnel's operations from one or multiple workstations.

Enhancing safety of your road tunnels and highways tollbooths

Zenitel solutions deliver clarity in the most challenging of environments



Public Address and Voice Alarm Solutions

Zenitel Public address and Voice Alarm solutions keeps drivers informed and safe, even when hundreds of meters underground.



Emergency Communication Solutions

Crystal clear communication helps drivers to report traffic anomalies or major accidents in the tunnel, assisting overall tunnel safety.



Tunnel Control Solutions

Consolidated management and monitoring of your entire tunnel security systems from a single GUI.

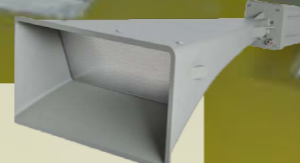
Heavy duty announcement point

Designed to withstand demanding environmental conditions, the heavy-duty microphones housed in IP67 enclosures are ideal for challenging settings. These microphones serve as reliable announcement points, ensuring secure communication throughout tunnels or cross passages, providing a convenient solution for managing and addressing immediate needs in specific areas.



Tunnel Loudspeaker

These tunnel horn loudspeakers are engineered to project clear and intelligible sound over long distances. By focusing and directing the sound effectively, they reduce the overall number of speakers required for proper audio coverage in the tunnel. This not only simplifies installation but also minimizes costs associated with speaker placement and maintenance.



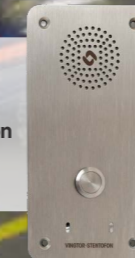
IP audio integration kit

Make your existing fireman's panels, radio, and other equipment work seamlessly together with Zenitel PAVA solutions using our IP audio Integration kit.



Vandal resistant Help points

Vandal and water resistance help points delivers crystal clear two-way communication between a driver and control room operator during an emergency situation.



Emergency Microphones

EN 54-16 First Operator Panel, wall mount with up to 50 physical buttons



Heavy-duty telephones

Ensure unparalleled audio quality for critical communication in rough environments such as road tunnels and highways. Robust, water- and dust-resistant (IP66) telephones are equipped with Zenitel's advanced networking and security features and superb audio technology, such as active noise filtering, echo cancellation and high-power audio outputs.



Compact Public Address and Voice Alarm

Our systems provide you with excellent flexibility and versatility with a wide range of installation options. The hardware can be mounted in a traditional 19" cabinet or in Zenitel's compact wall mount enclosure ensuring increased profitability and lower overall system delivery costs.



Public Address and Voice Alarm Solutions

Zenitel Public Address and Voice Alarm solutions keeps drivers informed and safe, even when hundreds of meters underground



CUSTOMER NEEDS

Provide Audio Excellence in Challenging Environments	Ensure Around-the-Clock Operations with Nearly Zero Downtime	Adapt Communication Systems as Needs Change	Seamless Integration and Easy Migration	Lower Costs. Save on Equipment
Experience outstanding broadcast intelligibility and speech quality optimized to cater to varying real-time ambient noise levels. Our solutions come with a built-in Ambient Noise Sensor, noise compensation technology, and VIPEDIA's Digital Signal Processing, providing sophisticated EQ Controls.	Our solutions, based on VIPEDIA's decentralized architecture, are equipped with built-in redundancy and automatic hot standby systems, ensuring high availability 24/7. Even if the central controller is unavailable, local emergency microphones remain functional with our unique "hardware bypass" option.	Get ready for future expansion with our flexible VIPEDIA's future-proof audio-over-IP architecture and modular design. We ensure simplified installation and excellent scalability that allow you to expand your systems easily and quickly by adding new modules as your needs change.	Zenitel provides customers with unparalleled interoperability. Our solutions are designed to work smoothly with a wide range of third-party PA systems. We can facilitate a seamless integration with your existing products either during a changeover phase or on a permanent basis.	Get all the benefits of the cost-effective all-inclusive solution that ensures critical communication, information and entertainment broadcasting. With VIPEDIA's multifunctional design, our customers can run both safety-critical Voice Alarm as well as high-fidelity background music and public address application.

Recommended products

HIGH POWER HORN SPEAKER

- Weatherproof design, tailored for use in harsh and dusty road tunnels
- Ensures voice announcements broadcasting with excellent speech intelligibility and large area coverage. Uses a minimum number of loudspeakers providing a maximum average SPL of at least 135dB with enormous sound pressure level



DYNAMIC AMBIENT NOISE SENSOR (DANS)

- Designed to operate in harsh environment with IP65 rating
- DSP technology to distinguish the ambient noise from the announcement to continually optimize broadcast intelligibility

MULTI-BUTTON PA OPERATOR PANEL (SAP03)

- Full compliance with EN 54-16
- Equipped with up to 50 buttons for zone selection
- Provides both wall and desk mounting options
- Optionally can be fitted with fist mic



SINGLE BOX WALL MOUNT PAVA (INTEGRA)

- Extremely powerful, yet cost-effective and space-efficient, the wall-mount INTEGRA PAVA system is tailored to tunnels where installation space is a priority
- Small size doesn't mean small power. Supports amplifiers for up to ten horn loudspeaker positions, with a maximum total power of 2000W RMS
- Full compliance with EN 54-16
- Provides professional sound performance with built-in DSP and EQ
- Equipped with analog inputs and outputs for legacy systems

EMERGENCY MICROPHONE (EMS RANGE)

- EN 54-16 Fist Operator Panel, wall mount with up to 50 physical buttons
- Lockable IP 30 enclosure
- IP or analogue connectivity
- Dual hosting and hardware bypass



Emergency Communication Solutions

Crystal clear communication helps drivers to report traffic anomalies or major accidents in the tunnel, assisting overall tunnel safety



CUSTOMER NEEDS

Ensure clear real-time communication with a person in distress or during other emergencies	Comply with all local and international regulatory requirements	Provide accessibility for all travelers. Meet the needs of people with disabilities
Zenitel help points provide our customers with excellent audio and video quality for reliable emergency communication, allowing your staff to see and hear travelers in distress. Our Automatic Volume Control solution continuously monitors ambient noise levels and intelligently adjusts audio, ensuring that passengers hear every word. Additionally, our Active Noise Reduction feature eliminates background noise, providing your operators with unmatched speech clarity.	We are well positioned to deliver reliable communication systems that meet international and local regulations and building codes. Our solutions are based on state-of-the-art customizable audio and video IP kits that offer the same top-notch performance, reliability and advanced audio and video features as our off-the-shelf systems. That's why our engineers tailor passenger help points to your specific needs without compromising on quality.	Ensuring accessibility for all travelers is one of Zenitel's top priorities. All our transportation help points are created in full compliance with accessibility norms. Our inclusive transportation solutions are equipped with custom front plates with braille and engraved symbols for the visually impaired, as well as audio induction loops for the hearing-impaired. We also designed our Public Address and Voice Alarm applications to work seamlessly as a single system with third-party hearing loops.

Recommended products

VANDAL-RESISTANT HELP POINTS

- Vandal and water-resistant systems built for use in the harshest environments
- Housed in stainless steel (AISI 316L) casing to withstand corrosion
- Equipped with advanced technologies such as active noise filtering, acoustic echo cancellation, wide band audio codec, and high-power audio outputs that provide unmatched audio quality



INTELLIGENT COMMUNICATION SERVER

- Designed to provide clear critical communication in the noisiest environments
- Ensures system robustness and low downtime during software upgrades with dual software images
- Secure boot, hardware Root of Trust – RoT
- Multifunctional system supporting both telephony call as well as high quality professional PA broadcasting for maintenance personnel inside the tunnel

BUILDING BLOCKS FOR YOUR TAILORED PRODUCTS

- The IP audio kit features an extremely compact form factor as space is at a premium within Rolling Stock
- Comes with full of advanced audio features such as Open Duplex, background Noise Cancellation and Automatic Gain Control making it a perfect choice for tailoring your driver panel
- Can be integrated into legacy radio system with two-way audio via line level input and output

HEAVY-DUTY TELEPHONES

- Designed with thick aluminum casing, stainless steel materials, and a high IP66 protection rating to withstand the challenges of rough environments, such as tunnels
- Provides high-quality communication and excellent speech intelligibility thanks to HD Voice and Zenitel's advanced audio technologies

Tunnel Control Solutions

Consolidated management and monitoring of your entire tunnel security systems from a single GUI



CUSTOMER NEEDS

Help your staff to respond quickly and efficiently in an emergency	Reduce equipment downtime and maintenance costs	Respond to the needs of people with disabilities
<p>Our critical communication solutions are designed to help your staff make correct decisions during emergencies. We equip the systems with a simple and intuitive 3D interface that classifies and prioritizes alert events. Intuitive routing ensures that important information is transferred to the relevant officer in real time, allowing your staff to quickly choose appropriate actions, such as broadcasting an announcement via the public address or voice alarm, panning a camera or zooming in on the desired area.</p>	<p>Intelligent alarm handling provides automatic activation of contingency plans in case of failure, significantly reducing downtime and maintenance costs for our systems. Your staff receives not only real-time halting alerts but also detailed diagnostics and suggested actions to take. All necessary information about affected equipment or rack location is available in an intuitive interface with just a single click. The system provides operators with two levels of alarm information: a summary level for operational staff and a low-level detailed for the maintenance team.</p>	<p>With our flexible hardware architecture, our engineers are well positioned to design custom systems and adjust products to all our customers' specific needs.</p> <p>Our scalable iVENCs tunnel Control Solution runs smoothly on any number of operator workstations with multiple redundant servers deployed either locally or at a remote location. The system can be easily virtualized in a company's data center to accommodate the special needs of our customers.</p>

Recommended products

VIPA-WS

- Public Address touch screen workstation
- Integrated client server
- IP connectivity
- Providing flexible control and monitoring of the PAVA System
- Scalable up to 384 zones
- Support multiple user accounts
- Customisable 2D button or graphical GUI
- No ongoing license costs

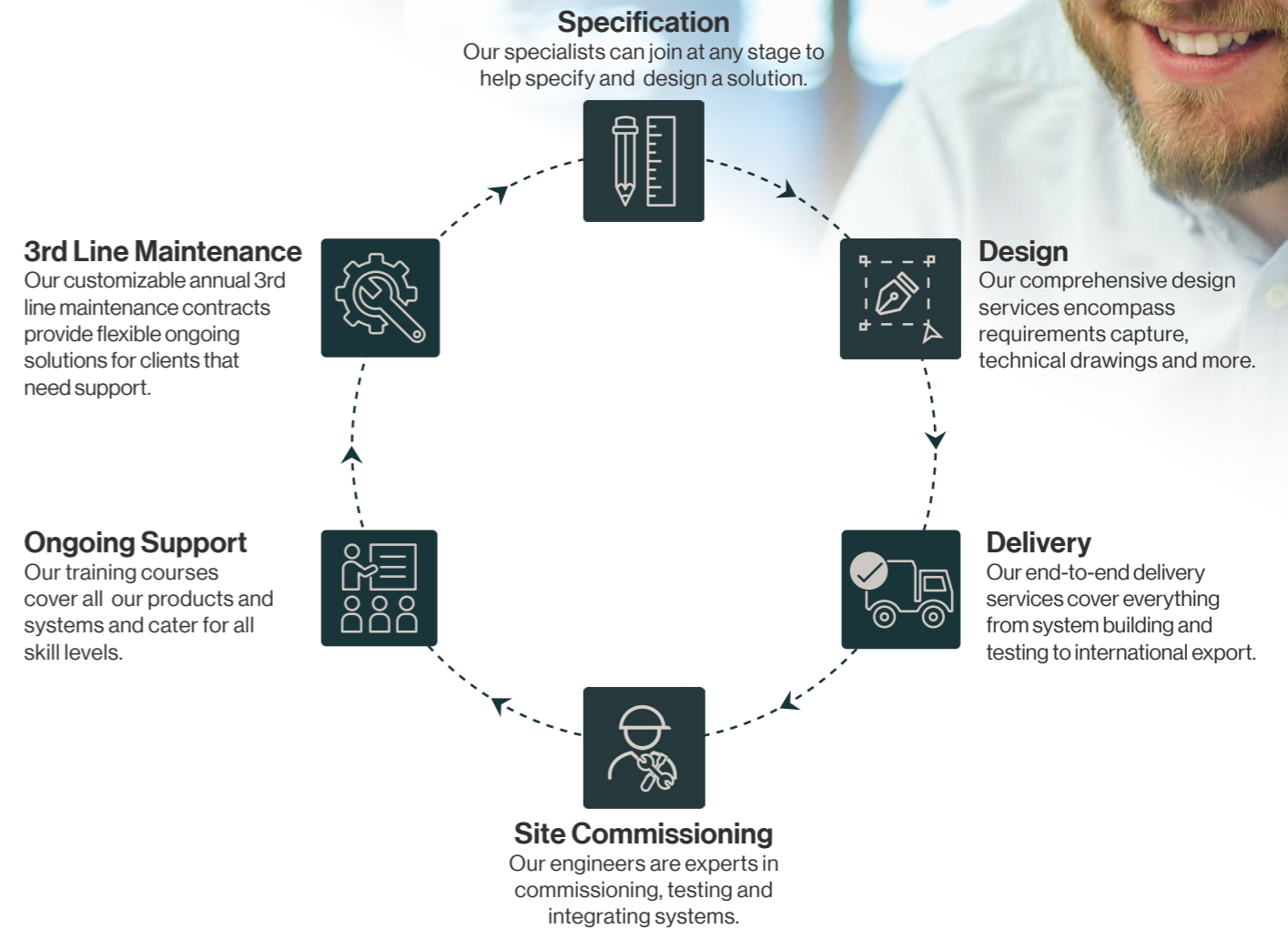


iVENCs

- Award-winning Open and intuitive integrated management platform
- Offering comprehensive control, monitoring, and incident analysis across various subsystems, typically the PA system
- Modular system architecture; easily expandable
- IP connectivity
- Customisable 2D GUI or powerful true 3D model
- Remote Condition Monitoring
- Cross-platform support
- Optional customer site-specific integrations
- No ongoing license costs

Supporting you all the way

When it comes to transportation solutions, Zenitel's product reliability, range and quality are unparalleled. But what truly sets us apart from the competition is the comprehensive range of services and support that we offer.



Begin your journey with us

Get in touch with our team of experts:
zenitel.com

We deliver peace of mind with proven and trusted communication solutions

With over 125 years of experience and thousands of successful deployments of transportation solutions, Zenitel is well positioned to meet customer expectations and help our clients ensure the safety, security, and well-being of both the staff and the passengers.

With a strong reputation as an expert in delivering reliable products and services, Zenitel is trusted by Highway and Tunnel operators worldwide. We are here to help you to ensure the safety and security of your travelers, employees, assets, and critical infrastructure.

Selected References

Pragti Midan Tunnel, India

SOS and Public Address System provides clear communication for the state-of-the-art tunnel project.

Tunelový Rozhlas, Slovakia

EN54-compliant Voice Alarm Solution to handle the challenging acoustic environment.

Túnel de la Línea, Colombia

Clear communications throughout the 5.3-mile-long tunnel.

Hornberg Tunnel, Germany

Successful upgrade of emergency call system in the tunnel maintaining existing infrastructure.

Public Address & Alarm products availability in the Americas market is pending.