

S E R V I C E   A P P L I C A T I O N   N O T E

**Distributed Antenna Systems**

***Distributed Antenna Systems (DAS)  
for professional radio services***

*For construction companies, respecting projects' strict deadlines is crucial. Raycap can work with stakeholders in order to deliver multi-technology Distributed Antenna System (DAS) solutions which support the necessary professional radio services, on-time and within budget.*



Due to increasing safety and regulation requirements, civil engineering companies are looking for reliable partners capable of designing, sourcing and implementing indoor coverage systems, using the proper tools and services to create a turn-key solution supporting multiple technologies like TETRA, VHF, GSM-R or FM.

**Services**

- Prepare specifications for DAS within the Electro-mechanical Work Package
- System design, procurement and delivery of materials
- Installation, commissioning, and full documentation
- DAS project management
- Operation and maintenance
- After-sales support

**Applications**

- Road tunnels
- Railway tunnels
- Subway and tramway tunnels
- Airports, shopping malls, hotels, convention centers and hospitals

**Why Raycap?**

- Customized solutions
- Experienced engineering team, dedicated radio planning tools and resources
- All professional technologies (TETRA, VHF, GSM-R, FM break-in) as well as mobile technologies
- Independent work packages or complete turn-key project responsibility
- Successful track record of high-profile DAS projects in South Eastern Europe

**Raycap Approach**

- Multi-technology system
- Vendor-independent, future-proof infrastructure
- End-to-end solution
- Highest quality-of-service



**Case Study**

- Indoor radio coverage for the three Tembi Valley road tunnels of the Aegean Motorway in Greece, part of the European route E75
- Primary contractors: HOCHTIEF, AKTOR, J & P, VINCI GRANDS TRAVAUX
- Electro-mechanical systems integrator: Siemens
- Construction: 2011 – 2016
- Configuration: 2 tubes per tunnel, emergency exits
- 3 road tunnels (T1, T2, T3), 22 km of tubes in total
- T2 is the longest road tunnel in South Eastern Europe (6 km per tube)



Raycap delivered the public safety indoor coverage system for the Tembi Valley tunnels in 2016.

It successfully integrated with the tunnels' SCADA systems and supports:

- 3 VHF channels for police, fire brigade, and ambulance services
- 2 TETRA channels for tunnel operation and maintenance teams
- Redundancy automatically controlled by the SCADA system

This DAS infrastructure enables uninterrupted radio communications for the emergency services when entering and operating inside the tunnel: in case of an incident, the emergency intervention teams will be able to use their own dedicated radio bands from anywhere in the tunnel.



**DAS for Tembi Valley tunnels in a few numbers:**

- 2 master stations
- 7 slave stations
- 22 km of radiating cables

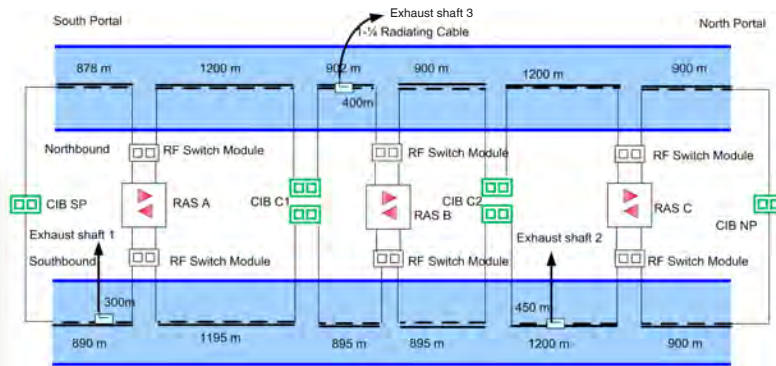


Diagram of the indoor coverage system architecture at T2 tunnel.

*With more than 25 years of experience in building telecom network infrastructure throughout Southern Europe, Raycap is a reliable partner for civil engineering companies and infrastructure operators who are looking to add indoor radio coverage capabilities.*



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