

PRESS RELEASE

## SENER brings artificial intelligence to the M-30

### The company will apply artificial intelligence tools to define ventilation algorithms in case of fire in Madrid's M-30 tunnel network.

Madrid (Spain), February 23, 2022 - The engineering and technology group [SENER](#), creator of the innovative [RESPIRA® system](#), which uses artificial intelligence to optimize ventilation and climate control in indoor spaces, has been chosen by Madrid Calle 30 to develop engineering to automate the ventilation system in the event of fire in the M-30 tunnels, within the framework of renewing the tunnels' centralized management.

SENER has been awarded the civil tender "Engineering for the automation of the ventilation system in the event of fire," corresponding to the second batch of the contract "Renewal of the centralized management of the Madrid Calle 30 tunnels." The contract is conducted in partnership with ImesAPI, with SENER being the lead member of the bidding consortium, with an 80% stake.

As part of this contract, SENER comprises the Madrid Calle 30 expert committee responsible for defining the appropriate ventilation algorithms which, in the event of fire, prevent problems of smoke from compromising people's safety during the emergency evacuation process.

Madrid's M-30 tunnels form an underground infrastructure complex of approximately 48 km in length with various types of sections and constructions, with a total of 22 off-ramps and 21 on-ramps. The complex geometry of the network, coupled with a variable ventilation system and with different configurations throughout the network, makes it one of the world's most demanding road tunnel complexes in terms of ventilation control.

The consortium will analyze the capacity of the ventilation system in the various sections of the tunnel by conducting field visits, using simulation tools and analyzing all the data collected in the infrastructure since it was opened in 2007.

SENER will use artificial intelligence tools to undertake the work, seeking to obtain operating patterns and correlate the fluid dynamics of the infrastructure with external factors such as weather and traffic, as well as the operation of ventilation equipment. This technology will help process information from more than 100,000 signals that are continuously recorded in the control center and will enable the Computational Fluid Dynamics (CFD) simulation models to be calibrated to analyze any ventilation system actions in different situations of interest, such as in the case of fire.

The defined ventilation algorithms will be integrated into the new control system that will be developed by SICE within the framework of an independent contract, and will be verified by SENER and ImesAPI using a total of 66 aerodynamic tests and 75 hot smoke tests in the various areas of the tunnels.

This project represents a further step for SENER in applying artificial intelligence to resolve complex problems in the field of ventilation. The most recent precedent is its RESPIRA® system, which has managed all ventilation systems in the conventional Barcelona Metro network since July 2020. In this facility, the use of RESPIRA® has led to significant energy savings for Transports Metropolitans de

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Barcelona, also resulting in more efficient temperature control, with a drop of more than 1° C inside the network and the consequent improvement in passenger comfort. By correlating all the information, technicians can improve maintenance tasks by quickly identifying any abnormal operation in specific devices of the HVAC network. They can also determine which stations in the network require new investments in order to ensure optimal passenger comfort. The RESPIRA® system is thus helping to efficiently and sustainably manage the HVAC components.

### **RESPIRA®, SMART VENTILATION**

RESPIRA® is an artificial intelligence solution that is capable of determining the ideal ventilation strategy by defining several criteria and reading parameters in real time, such as the indoor temperature, humidity, air quality, and the efficiency of HVAC devices. This information is used by a dynamic algorithm to predict the environmental conditions (depending on the weather forecast, the service to be provided and other factors) and then apply a mode of operation to the ventilation units in order to ensure proper air flow while minimizing electricity consumption inside the structure. Thanks to the ability of RESPIRA® to optimize HVAC systems with machine learning and automatic learning applications, the performance of HVAC systems is constantly being evaluated to yield the perfect ventilation strategy at all times.

This new project is part of one of SENER's strategic lines in the field of infrastructure, which seeks to develop intelligent digital systems that provide solutions to the real problems of the various stakeholders in the value chain and in society as a whole by relying on the combined expert technical knowledge of its engineers and the enormous potential of new digital technologies.

### **About SENER**

*SENER is a private engineering and technology group founded in 1956, which seeks to offer its clients the most advanced technological solutions and which enjoys international recognition thanks to its independence and its commitment to innovation and quality. SENER has 2,400 professionals on five continents.*

*SENER combines the activities typical of Engineering and Aerospace, and, through the SENER Renewable Investments brand, it has ownership stakes in companies working in power generation.*

*For its part, SENER Engineering has become a global leader in the infrastructure, energy and marine sectors, and SENER Aeroespacial has more than 50 years of experience and is a top-tier space, defense and science supplier.*



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