

The Spanish Segula Technologies team completes the TOPONE project, an autonomous drone capable of inspecting electrical wiring in underground visitable galleries.

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- *After two years of work, the R&D&I department of the Industry and Energy division of SEGULA Technologies Spain has developed the hardware and software of a drone designed to perform autonomous visual inspections of power lines.*

Madrid, 21 November 2024. The Spanish team of the global engineering group SEGULA Technologies has announced the successful completion of the **R&D&I project TOPONE**, funded by the Centre Technological Development and Innovation (CDTI). This project has launched an **autonomous drone specialised in the visual inspection of power lines in tunnels and visitable underground galleries**. This project arises from the need to reduce occupational accidents among technical personnel, one of the jobs where the risk is highest due to low oxygen concentrations, high concentrations of noxious gases, high temperatures and the risk of collapse, among other factors encompassed in what are known as confined spaces. In fact, **according to data from the International Labour Organisation (ILO) and the Occupational Safety and Health Administration (OSHA), around 200 deaths occur each year in this type of confined space.**

In this context and after two years of work, the R&D&I department of the Industry and Energy division of SEGULA Technologies Spain has developed the hardware and software of a drone designed to carry out these visual inspections of the power lines autonomously. This innovation improves the working conditions of the technicians in charge of these inspections.

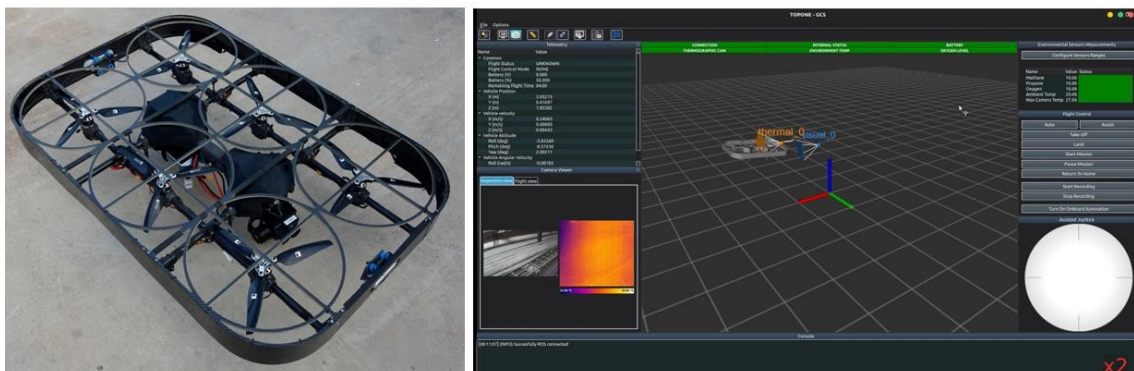


Illustration 1 On the left: Prototype of the project drone. Right: Prototype control station.

The drone has a camera that provides RGB and thermographic images of the cables mounted on a gimbal that facilitates its stability and mobility. In addition, it has integrated sensors to measure the ambient temperature, oxygen percentage and some gases harmful to humans in order to alert users of adverse conditions in underground areas. At the same time, it has a control station that displays all the information needed to inspect the power lines and see the route the drone is taking.

For autonomous navigation, the TOPONE project prototype has two cameras that allow it to move through the underground gallery, obtaining a point cloud of the environment.

"Thanks to all the effort made by the team, we have been able to validate the TOPONE prototype as well as the mission system, the autonomous navigation algorithms and, above all, it has been demonstrated that this type of visual inspections can be carried out without putting technical personnel at risk. To be fully operational, this drone has also required the development of complete software architecture that integrates several modules, including a localisation and perception system, a control and guidance system, and a system for mission-specific data. Each of these modules has been subjected to rigorous testing, in the computer, in the laboratory and in real galleries such as those in the facilities of the Palacio de Ferias y Congresos de Málaga (FYCMA). This opens the door for SEGULA to continue working on the project to reach a marketable product and service for its customers," explains the head of R&D&I of the Industry and Energy division of SEGULA Technologies Spain.



*Photographs available here

About SEGULA Technologies

SEGULA Technologies is a global engineering group that contributes to increasing competitiveness in all major industries: automotive, aerospace and defence, energy, rail, marine, pharmaceuticals and petrochemicals. The Group operates in more than 30 countries with 140 offices around the world and maintains close customer relationships thanks to the experience of its 15,000 employees. As a leading engineering specialist that puts innovation at the heart of its strategy, SEGULA Technologies carries out major projects ranging from technical studies to industrial applications and production.

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