SUCCESS CASE 44.2025

TST-Bot

A ROBOT FOR LIVE MAINTENANCE ON MV OVERHEAD LINES

THE CHALLENGE

In 2018, Enedis launched a project to automate medium voltage (MV) live working activities, aiming to provide teams with a cutting-edge tool designed to improve ergonomics and enhance risk management on worksites. As part of this initiative, the OTELO proof of concept (POC) demonstrated in 2021 the feasibility of **robotic arms remotely operated from the ground to manipulate tools and accessories on overhead lines**.

Since 2022, Enedis has been working on industrialising this concept and has initiated the development of a prototype named TST-Bot. The specifications for TST-Bot were the result of a collaborative effort involving representatives from all key stakeholders within the company involved in MV live working activities, including operators, work supervisors, managers, technical experts, equipment specialists, and safety advisors. During the prototype development phase, the robotic components of the TST-Bot were subjected to various types of tests, including resistance to electrical arcs and immunity to electric and magnetic fields, to ensure their reliable performance when in contact with energised components. The first tests to execute specific use cases on a training network were successfully completed in late November 2024.

THE SOLUTION

The TST-Bot prototype is built on a **spider lift platform equipped with two robotic arms**. The platform's bucket has been replaced by an insulating interface that supports the two robotic arms, their batteries, the control system, and the cameras. The TST-Bot is designed to allow operation under the following conditions: rain, wind speeds of up to 45 km/h, and temperatures between 0 ºC and 45 ºC. For the time being, TST-Bot performs four use cases :

- Installation of bird protection devices.
- Lubrication of overhead switches.

For more information about the project, please contact:
ANNE-LAURE.POPELIN@ENEDIS.FR

- Operation of jumpers.
- Installation of temporary switch-disconnector tools.

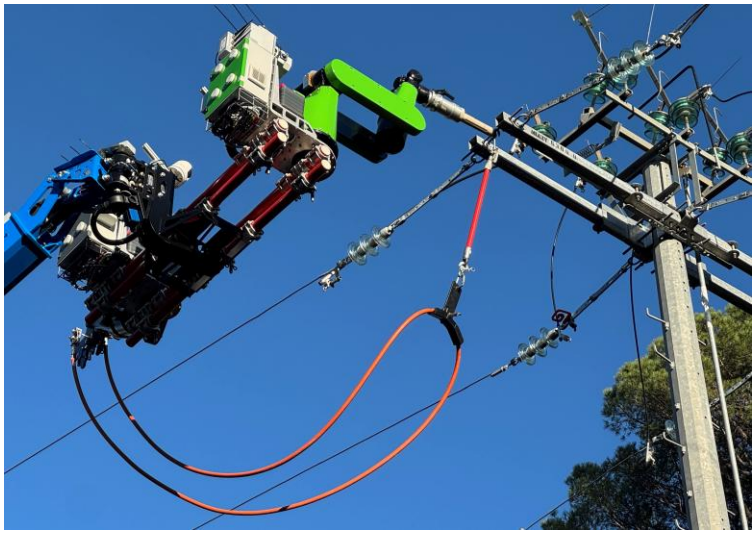
These are considered basic activities. More complex use cases may be explored in the future.

EXPECTED BENEFITS

In a context of increasing need for live working activities, mainly driven by the energy transition, TST-Bot will enable live working teams to **carry out more complex operations** with added value. For example, these include the installation of poles and the replacement of conductor configurations and insulators. Moreover, technical professions are currently facing challenges in hiring and retention. The TST-Bot will **open new opportunities in live working to more diverse profiles** by shifting part of the activities to new technologies and reducing the physical effort of technicians. In addition, in terms of safety, TST-Bot will contribute to improving **risk management for live working operators**, particularly regarding work at height, electrical hazards and musculoskeletal disorders.

WAY FORWARD

Throughout 2025, the TST-Bot will be tested on the MV network by four Enedis live working teams, identified and trained in its use, particularly in remote operation. Feedback will be collected and will take into account matters of performance, team acceptance, suitability of the TST-Bot for the activities, and safety considerations. This feedback will serve as the basis for a decision on industrialisation and potential rollout across the entire Enedis service area.



Robotic arms operated remotely from the ground.

For more information about the project, please contact:
ANNE-LAURE.POPELIN@ENEDIS.FR