



ROBOT FOR AUTONOMOUS TRENCHLESS OPERATIONS, UNDERGROUND MAPPING & NAVIGATION

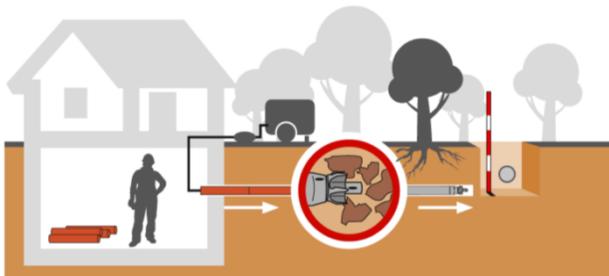
PROJECT GOALS

The goal of the project is the development of underground robotic system capable of:

Trenchless construction of subterranean small-diameter and high curved tunnels for water & gas pipes, telecoms cables, etc.

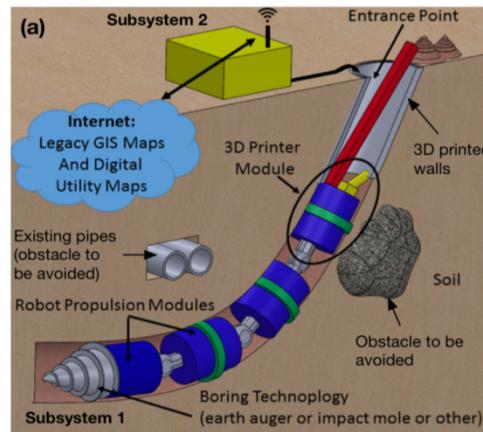
Autonomous localization, mapping and navigation during its operation in different and complex terrains

Intelligent combination of the massive data gathered during operation to improve its perception and cognition abilities



THE BADGER APPROACH

- Development of autonomous underground robotic system
- Novel ultrasonic drill-tool to foster pulverization of the rocks
- Tunnel's walls 3D printed with additive material for wall support



- On-board sensors & ground penetrating radar for autonomous 3D navigation
- Hierarchical control architecture for intelligent decision making

THE BADGER IMPACT

Introducing advanced robotic technologies, including intelligent control and cognition capabilities, to significantly increase European competitiveness.

Drastically reduce the traffic congestion & pollution increasing, in this way, the quality of life of neighbors and pedestrians

Enabling technologies for new potential applications: search and rescue, mining and quarrying, civil applications, mapping, etc.

KEY FACTS

- **Contract Nr:** 731968
- **Consortium:** 7 partners from 5 countries
- **Start:** January 2017
- **Duration:** 3 years
- **Programme:** H2020-ICT-2016-1
- **Budget:** € 3,7 M.
- **Further info:** www.badger-project.eu

“An underground robotic system that autonomously navigates in the subsurface by pulverizing, removing and pushing through the subsurface soil”



BADGER

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SPECIFIC OBJECTIVES

- **Objective 1:** To research and develop a highly innovative underground robotic system for autonomously performing trenchless operations
- **Objective 2:** To robotize existing robust and proven trenchless technologies and achieve unprecedented maneuverability, mobility, re-programmability and drilling capabilities
- **Objective 3:** To research and develop a dependable robot capable of boring into unknown or partially mapped underground environment
- **Objective 4:** To enable the underground robot to autonomously reach its desired goals with a novel control system architecture and methodologies
- **Objective 5:** To research and develop advanced cognition capabilities and methodologies that enable autonomous strategic decision-making on task planning and path planning problems
- **Objective 6:** To integrate all of the above research outcomes into a market-led robotic system

PARTNERS

The BADGER Consortium consists of 7 complementary partners from 5 different European Countries, namely Spain (Madrid, Valencia), United Kingdom (Glasgow), Greece (Thessaloniki, Athens), Italy (Pisa), Germany (Lennestadt)

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