PIPEON Impact

- **Boost Autonomous Sewer Technology Adoption:** Engaging EU water utilities to adopt autonomous sewer maintenance.
- **Enhance AI & Sensor Technology:** Improving defect detection and sewer monitoring with advanced AI and multi-sensor systems.
- **Reduce Flooding & Wastewater Spills:** Deploying autonomous robots to install flow monitors and clear blockages, preventing overflows.
- **Lower CO_2 Emissions:** Minimizing maintenance travel and enabling early repairs to lower environmental impact.
- **Support EU Water Policies** – Aligning with the updated Urban Wastewater Treatment Directive to improve system monitoring and wastewater management.

About PIPEON

Start date: 01 January 2025

Duration: 48 months

Budget: €7.997.691.25

Project coordinator: Tallinn University of Technology

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Funded by the European Union

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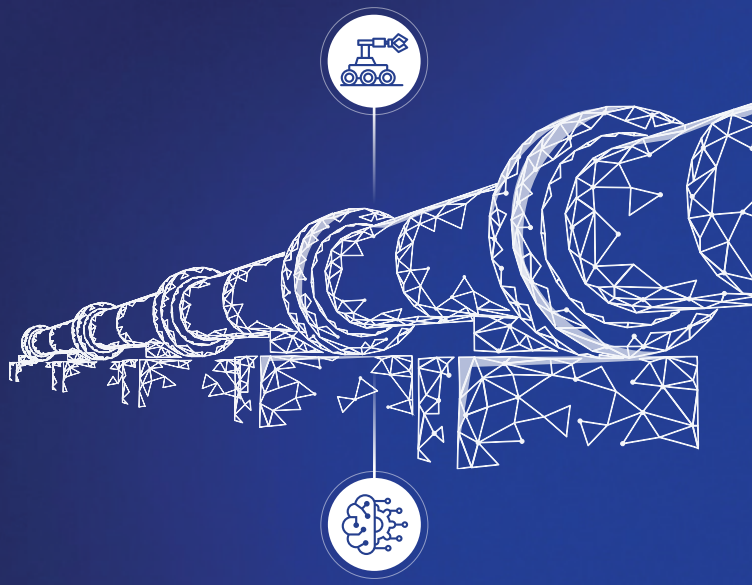
Robotics and AI for Sewer Inspection & Maintenance

Revolutionising Sewer Management: AI-Powered Robots for a Cleaner Future.



What are the challenges?

- **Limited Sewer Network Visibility:** Many sewers remain unmapped, hiding potential risks, leading to unexpected failures and costly emergency repairs.
- **Inefficient & Outdated Inspections:** Manual CCTV analysis is time-consuming, costly, and prone to human error, delaying maintenance actions.
- **Harsh & Hazardous Environments:** Corrosive, abrasive, and gas-filled sewer conditions make human access and traditional robots ineffective.
- **Frequent Blockages & Pollution Risks:** Fats, textiles, and debris frequently clog sewers, causing overflows that threaten ecosystems and public health.
- **Reactive vs. Predictive Maintenance:** Sewers' maintenance is often reactive, increasing costs, infrastructure damage, and environmental risks.

Our objectives

- **Develop** AI-driven robots to navigate, inspect, and maintain sewers in corrosive and hazardous environments.
- **Enable** real-time detection and proactive repairs to prevent failures before they occur.
- **Leverage** advanced sensors and AI to deliver real-time, detailed insights for better network management.
- **Automate** clog removal and leak detection, reducing sewer overflows by 30%.
- **Increase** cost-efficiency and sustainability by cutting inspection costs by 10x with robotic automation, smart decision-making, and digital twin technology.

Case Study 1

- **Location:** Heusden, Netherlands
- **Main Focus Area:** Urban sewer system improvements
- **Background:** The system faces flooding capacity issues due to large runoff areas draining into the sewer.
- **PIPEON Solution:** Implementation of AI-powered robotic inspection and maintenance to improve system reliability.
- **Expected Impact:** Reduction in sewer overflow spills, increased monitoring reliability, and improved hydraulic performance.
- **Leading Partner:** Gemeente Heusden

Case Study 2

- **Location:** Bærum, Norway
- **Main Focus Area:** Peri-urban wastewater and surface water management
- **Background:** The wastewater system suffers from leakage, blockages, fat buildup, gravel accumulation, and surface water intrusion.
- **PIPEON Solution:** Deployment of high-pressure washing and robotic inspections to enhance maintenance effectiveness.
- **Expected Impact:** Improved sewer functionality, reduced blockages, and increased operational efficiency.
- Leading Partner: BAERUM KOMMUNE

Case Study 3

- **Location:** Hitra, Norway
- **Main Focus Area:** Rural wastewater infrastructure
- **Background:** The system's status is largely unknown, and it has not undergone regular cleaning or inspections.
- **PIPEON Solution:** Introduction of robotic monitoring and AI-driven inspection tools to assess and maintain infrastructure.
- **Expected Impact:** Better infrastructure management, reduced system failures, and improved rural wastewater monitoring.
- **Leading Partner:** Hitra kommune