URBAN MOBILE ROBOTICS

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Centre for Economic Development, Transport and the Environment

Call for Tenders: Themes and Challenges

The Urban Mobile Robotics project calls for companies to develop and research solutions that respond to authentic challenges of an urban environment. The City of Helsinki will act as a living research platform where the participants can test and develop new robotics technologies that perform tasks in the air, on the ground, or in water.

Our goal is to create an open and diverse testbed ecosystem that brings the city, businesses, and research organizations together to develop smarter, safer, and more sustainable solutions.

Our three main themes drive the challenges and pilots:

Smart Ground – A functional and sustainable city throughout the year

Blue City – A safe and digitalized marine city

Urban Sky – A smart and controlled urban airspace

Under each theme, there are concrete challenges that companies can offer their own solutions to. Companies can submit suggestions for one or more challenges or suggest a completely separate robotics-based pilot outside the scope of the themes that produces useful data for the city's purposes.

Blue City – A safe and digitalized marine city

Helsinki could be the first city in the world that continuously monitors, collects samples, and guards its marine areas with the help of mobile robotics. Our goal is to create autonomous, unmanned underwater vehicles and data solutions that monitor the quality of the water, map the seafloors, and promote aquatic and marine safety.

1. Safe beaches and ports

The goal is to create an autonomous surveillance and control system that improves the safety of public beaches, ports, and marine areas. The system will detect risks and anomalies on time, monitor the movements of swimmers, and detect emergencies in real time. Robotics equipment can also be utilized in lifeguard and rescue missions, collecting things from the water, identifying foreign objects, and monitoring the condition of waterways.

2. Smarter water quality monitoring and urban runoff management

Presently, monitoring water quality is slow and sporadic. Our goal is to achieve a real-time robotics and data analysis based report process that enables a quick response to any anomalies in water quality. The desired solution monitors cloudiness, oxygen and nutrient levels, temperature, and electric conductivity of the water as well as automatically takes samples of the water for future research.

3. Separate suggestion

Participants can also submit a separate, water-based robotics solution that brings added value to the City of Helsinki and its residents. The solution must perform tasks in the air, on the ground, or in water and produce data that can be utilized by different sectors of the city, such as improving infrastructure, security, or municipal management services.

Urban Sky – A smart and controlled urban airspace

The urban airspace is a brand-new infrastructure where drones and sensors serve as a part of the city's day-to-day life. Our goal is to create a safe and controlled airspace where mobile robotics promote surveillance, maintenance, and decision-making.

1. Smarter construction site monitoring

Monitoring and controlling construction sites takes a lot of resources and usually has to be done manually. Our goal is to improve the safety, transparency, and efficiency of construction sites by monitoring their progress and any possible anomalies in real time.

2. Preventive maintenance – detecting leaks and temperature anomalies

Each year, the city loses significant amounts of energy and water due to leaks and waste heat. Our goal is to develop a system based on aerial robotics and thermal imaging that detects leaks and anomalies early and enables preventive maintenance.

3. Separate suggestion

Participants can also submit a separate, aerial-based robotics solution that improves safety, monitoring, or energy usage in the city. The solution must perform tasks in the air, on the ground, or in water and produce data that improves the city's services or decision-making.

Smart Ground – A functional and sustainable city throughout the year

A functional and sustainable city uses mobile robotics, data, and circular economy to ensure that the city's infrastructure, maintenance, and logistics work effortlessly throughout the whole year. It is the nervous system of the city, maintaining its liveliness and the smooth running of its services with no interruptions.

1. Monitoring and modeling infrastructure

A city is made up of thousands of kilometers of streets, cycle routes, and tunnels, but maintaining them is scattered and laborious. Our goal is to create a solution that monitors the infrastructure of the city and offers constant, real-time, automatically updated reports.

2. Automation and logistics of winter maintenance

From 2028 onwards, dumping snow in the sea will be forbidden, creating a need for new means of collecting and handling the snow. Our goal is to build a preventive, data-driven robotics solution that handles the collection, transporting, storing, and melting of the snow in an eco-friendly and cost-efficient way.

3. Separate suggestion

Participants can also submit a separate, ground-based robotics solution that improves the efficiency of the city's infrastructure, maintenance, or logistics. The solution must perform tasks in the air, on the ground, or in water and produce useful data on e.g. the urban environment, traffic, or energy consumption.