



ADVISOR

Robust interoperability for autonomous vehicles

To address the lack of interoperability between autonomous vehicle (AV) classes, the ITEA project ADVISOR (Cooperative Missions of Autonomous Vehicle Swarms for Surveillance Tasks) will develop a framework for the efficient development, testing and execution of AV swarm missions.

Addressing the challenge

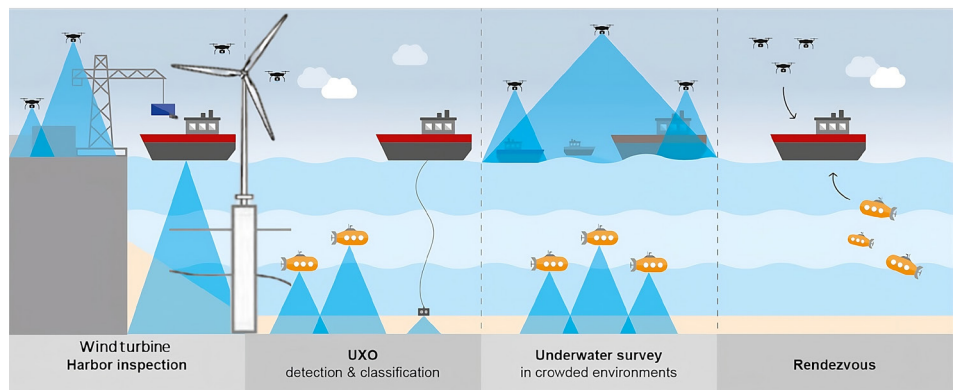
The maritime sector is highly strategic for Europe, but its infrastructure – such as ships, ports and offshore wind turbines – faces considerable servicing challenges. The ownership or hiring of a maintenance fleet is costly, while 75% of EU companies struggle to find the right personnel. AVs present a solution but currently lack seamless interoperability between airborne, underwater and on-water classes. These vehicles vary significantly in capabilities, mission planning and communication protocols, creating fragmentation that hinders efficient surveillance tasks.

Proposed solutions

To enable autonomous missions across various domains (including air, water surface and underwater), ADVISOR will develop an open platform for the flexible, extensible simulation, integration, testing and execution of multi-type AV swarms. For mission planning and monitoring, interfaces will allow users to input parameters such as waypoints, objectives and constraints while monitoring mission progress and vehicle status. To address navigation, perception, communication and data processing, co-simulation and integrated hardware-in-the-loop approaches will accurately represent the dynamics and interactions of various vehicle classes in different environments. Algorithms for autonomous vehicle localisation, navigation and control will further enable the vehicles to respond to dynamic surroundings. Robust communication interfaces will be developed for seamless data exchange

and coordination among classes, while vehicle controllers will interpret mission plans and manage vehicle status and operations. Finally, sensor data fusion and AI-based algorithms will integrate multi-sensor information for comprehensive environmental analysis and anomaly detection to make adaptive

party vehicles, users can create nearly infinite teamed vehicle combinations, allowing them to transfer operations from on-site to remote as necessary. This will reduce both their labour intensity (including a smaller operator-to-vehicle ratio) and environmental footprint through the use of smaller, electric and uncrewed vehicles for missions. Cost-effectiveness will be further improved through new functionalities for high-quality interpreted data on critical infrastructure. For instance, the project expects to completely remove the need for wind turbine downtime



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decisions. These innovations will be demonstrated in three industry-led use-cases at TRL 6-7: offshore infrastructure monitoring, remote maritime pilotage, and underwater inspection.

Projected results and impact

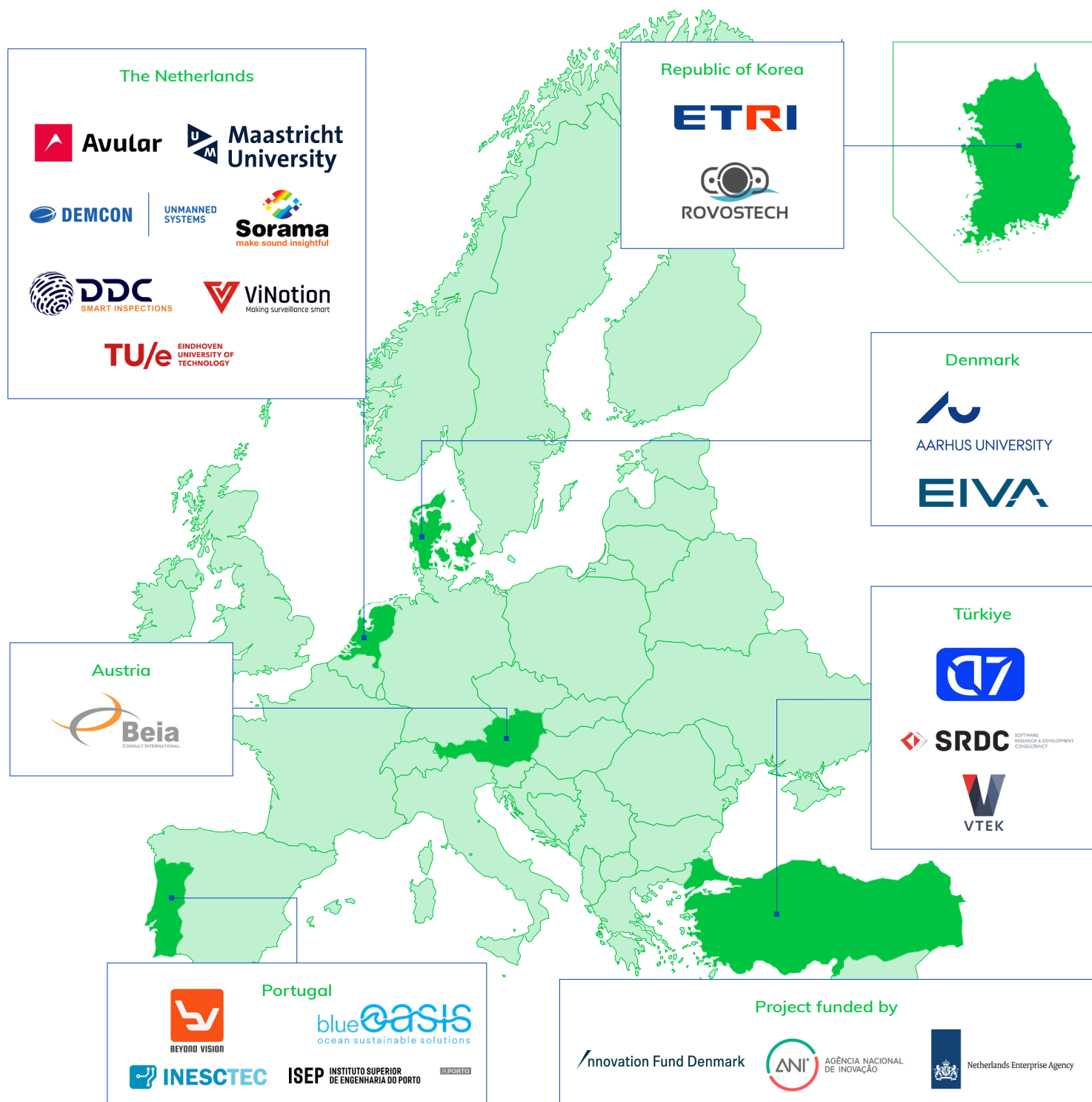
A plug-and-play platform for heterogeneous AV swarm control and simulation has not yet been developed. ADVISOR therefore has significant opportunities to improve efficiency, reduce costs, enhance security and minimise environmental impact. With vendor-agnostic interoperability for third-

during inspection, currently averaging over two hours. Meanwhile, ADVISOR will expand the consortium's business offerings and open up new markets via the development of intellectual property mechanisms to commercially exploit the TRL 6/7 building blocks. As a result, they estimate a profit of EUR 56 million// revenues of EUR 110 million//a turnover of almost EUR 159 million across the partners five years after the project's completion, all thanks to a complete revolution in surveillance, maritime infrastructure inspection and industrial automation.

Project partners

ADVISOR

23014



Project start
October 2024

Project leader
Tijs Wiefferink, DEMCON

Project website
<https://itea4.org/project/advisor.html>

Project end
December 2027

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