



FLEXIGROBOTS

Flexible robots for intelligent automation of precision agriculture operations

Motivation

FlexiGroBots aims to unleash the power of Artificial Intelligence and Robotics for developing flexible heterogeneous multi-robot systems that cooperate to accomplish complex tasks in an orchestrated way in various types of fields.

To overcome the barriers limiting the adoption of unmanned vehicles and robotics technologies in the agriculture domain, FlexiGroBots envisions a future where fleets of small/medium-size robots work along with drones in a flexible way to serve various needs of farmers for real-time decision making, monitoring of fields' status, reduce costs and optimise crops performance.

Project Information

Funding programme	H2020-EU.2.1.1.
Grant agreement	No 101017111
Duration	36 months
Start date	January 1st 2021
Overall budget	8,154,443.75 €
Coordinator	Atos IT

Objectives



Define a reference architecture and enablers for building mission control of heterogeneous multi-robot systems while allowing the secure and sovereign data exchange across companies and other actors involved in the agriculture sector



Contribute to the analysis of trustworthy AI for multi-robot systems in terms of transparency, human oversight, privacy, data governance, ethics, national regulations and trust requirements



Develop AI-driven robotics methods and services for advanced near-real-time analytics, automated decisions, and decision support for precision agriculture operations

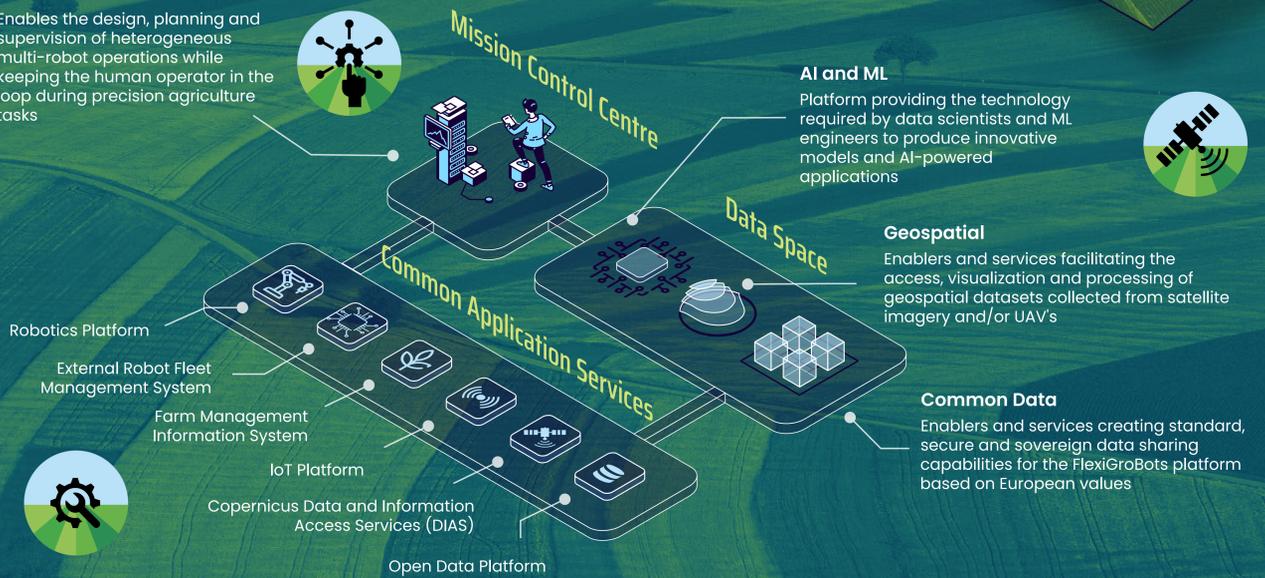


Reinforce AI4EU on-demand platform by reusing and extending the assets and know-how with a marketplace for AI-driven robotics components

The FlexiGroBots Platform

FlexiGroBots envisions the creation of a robust platform and data space for enabling missions of fleets of heterogeneous robots for precision agricultural tasks, where any technology provider that implements an International Data Spaces Association (IDSA) compliant connector could participate and where farmers will have full control of the data collected from their fields.

Enables the design, planning and supervision of heterogeneous multi-robot operations while keeping the human operator in the loop during precision agriculture tasks



Pilots

Gravepines (Spain)



Aims to demonstrate the high capacity and versatility of robots to carry out different tasks in vineyards. The drones are dedicated to the inspection and early detection of Botrytis cinerea and for obtaining data such as water stress, degree of maturation, etc. The ground robots perform close observation of grapes to complement the initial data captured from the air for a more accurate diagnosis of the grapevine condition including the application of phytosanitary treatment only on affected plants. Moreover, a collaborative working environment between robot basket carriers and operators during manual grape harvesting is foreseen.

Rapeseeds (Finland)



Validates FlexiGroBots solutions in pest management of oil crops and harvesting of silage by integration of unmanned ground and aerial vehicles to daily farm activities to reduce the working payload and perform tasks with higher accuracy, reducing time and resources spent.

Various use cases based on automated robots' collaboration are being implemented: robotised tractor in silage fleet, pest detection and pesticide spraying, situation awareness of tractor fleets, grass and rapeseed status mapping, rumex weeding, and silage harvesting plan.

Blueberries (Serbia and Lithuania)



Showcase the use of aerial and ground robots in fruit production which usually require a lot of manual labour and frequent visits to the fields to evaluate the status of the fruit. The aerial robots are used as primary tool for data acquisition and field monitoring, mapping weeds and areas affected by diseases. Based on the information collected by the UAV, ground robots execute soil sampling and target-spraying of pesticides.

The pilot includes three use cases: monitoring and detection of weeds and diseases in blueberries, smart soil sampling, and precision spraying.

Atos



CSIC

