Horizon Europe programme 2021

HE-CL6-2021-GOV-01 - *1st Joint Newsletter*

Meet the projects

CHAMELEON

Spade physical-cyber drones ecosystem agriculture • forestry • environment

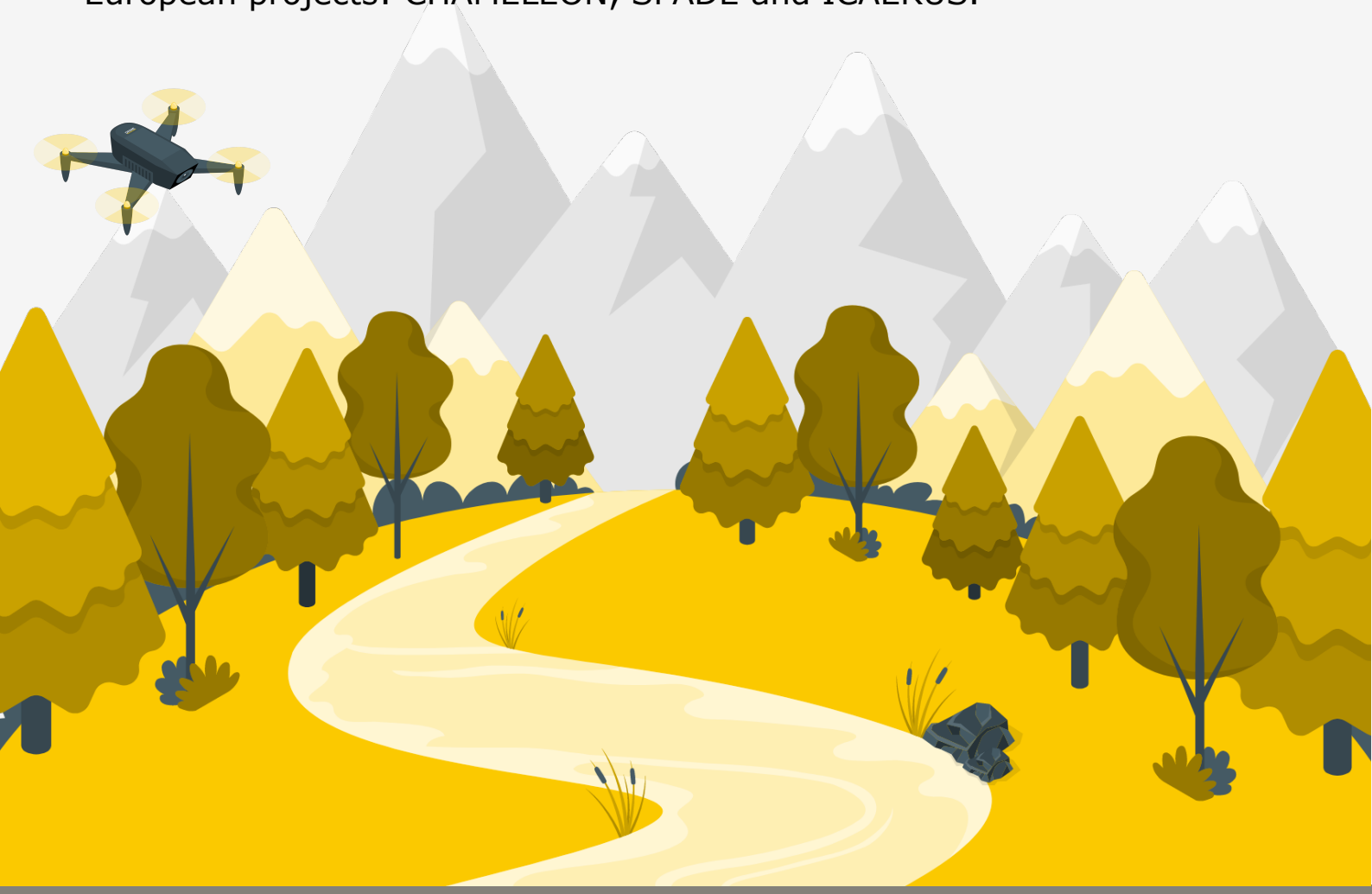
ICAERUS

THE OBJECTIVE

In agricultural and forestry sectors, drones have emerged as crucial tools for the management and monitoring of natural resources. Their ability to capture high-resolution aerial images allows forestry engineers to obtain precise and up-to-date data on the health and distribution of crops and forests.

This data is essential for early detection of diseases, pests, and nutritional deficiencies in plants, facilitating the implementation of more effective and less invasive corrective measures. Additionally, drones can perform reforestation and seeding tasks more efficiently and in hard-to-reach areas, thus optimizing conservation and ecosystem restoration efforts. The incorporation of drones in agroforestry practices not only improves the productivity and sustainability of natural resources but also reduces operational costs and minimizes the environmental impact of human activities.

Leveraging this technology and know-how in livestock farming is the right step for integrating drones as a multi-purpose solution. From livestock monitoring to health analysis, these are now feasible solutions. Learn about the advances and innovations on these current topics through three European projects: CHAMELEON, SPADE and ICAERUS.



COOPERATION

CHAMELEON, SPADE and ICAERUS are three projects that were funded under HORIZON - CL6-2021-01-21 in the category of "Potential of drones as multi-purpose vehicle". Therefore a synergy was found and carried out by the three projects that aims to help each other, find solutions to future problems, ensure efficient dissemination and worthwhile opportunities and simultaneously create knowledge that together with the developed solutions will transform the present situation in areas and fields that each of the projects is focusing and working on.

The expected results of this collaboration are:

- Sharing knowledge on using drones in rural areas
- Identifying new opportunities in the area of digital agroforestry services
- Bring awareness of the value of using drones in agriculture, forestry and livestock monitoring

PARTNERS

CHAMELEON

A Holistic Approach to Sustainable, Digital EU Agriculture, Forestry, Livestock and Rural Development based on Reconfigurable Aerial Enablers and Edge Artificial Intelligence-on-Demand Systems

Spade physical-cyber drones ecosystem agriculture • forestry • environment

Multi-purpose physical-cyber agri-forest drones ecosystem for governance and environmental observation

ICAERUS

Innovation and Capacity building in Agricultural Environmental and Rural UAV Services

CHAMELEON

A Holistic Approach to Sustainable, Digital EU Agriculture, Forestry, Livestock and Rural Development based on Reconfigurable Aerial Enablers and Edge Artificial Intelligence-on-Demand Systems

CHAMELEON is a Horizon Europe Project that aims to optimise production and identify potential problems in agriculture, livestock, forestry and rural areas.

To achieve this, the CHAMELEON Project will use a novel reconfigurable drone, able to modify its configuration and sizing upon demand, which can be deployed in homogeneous or heterogeneous groups to support complex scenarios, as well as a set of existing heterogeneous, modular, interoperable, networked unmanned vehicles systems.

THE TECHNOLOGY

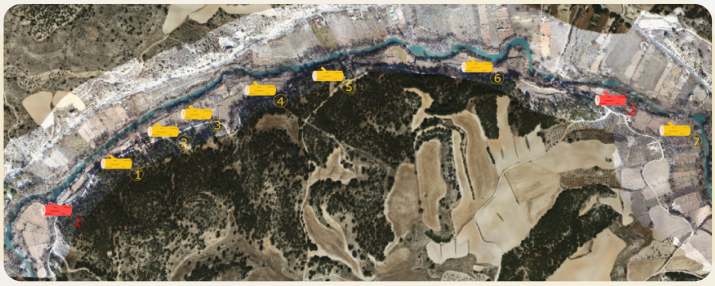
Forest

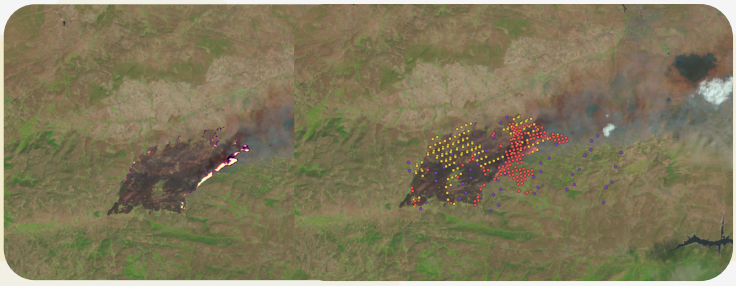
Photogrammetry Drone

UAV Image recognition

Satellite LiDAR

- Vegetation monitoring and census
- Continuity of vegetation
- Characterization of Wildland-Urban Interface
- Hotspot identification at the beginning of wildfire
- Health status of vegetation, ground cover and fungal growth
- Large woody debris on rivers



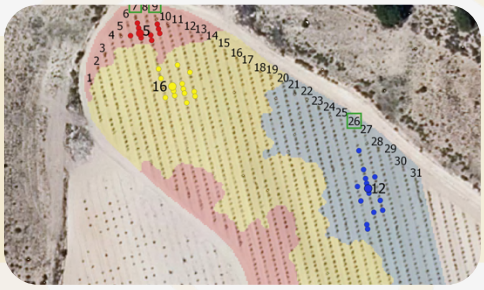


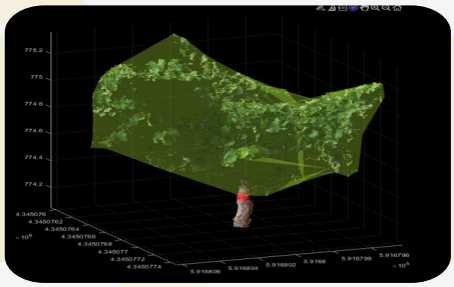
Agriculture

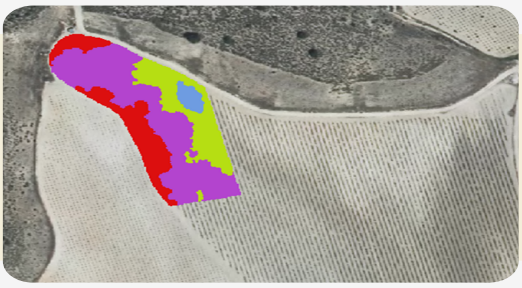
- Crop growth and development monitoring
- Vineyard water stress due to drought
- Soil zonification
- Monitoring flora at high-altitude

Drone Computer Vision

Photogrammetry Satellite





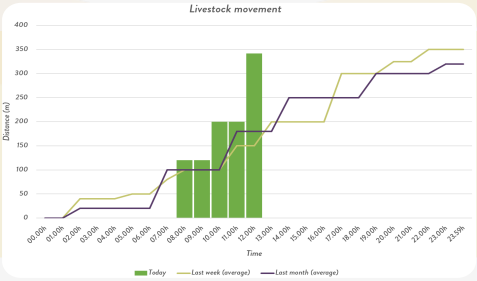


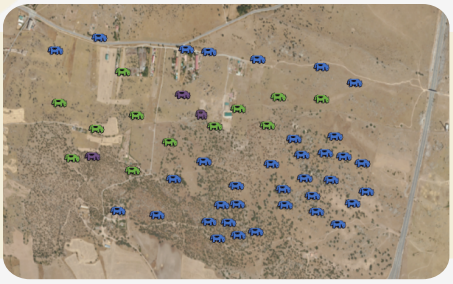
Livestock

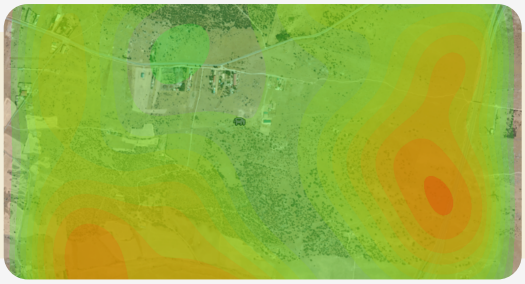
Drone Computer Vision

Image recognition IoT

- Lameness detection in cows
- Herd management and individual monitoring
- Animals health
- Collecting parameters of health and stress of livestock







Spade

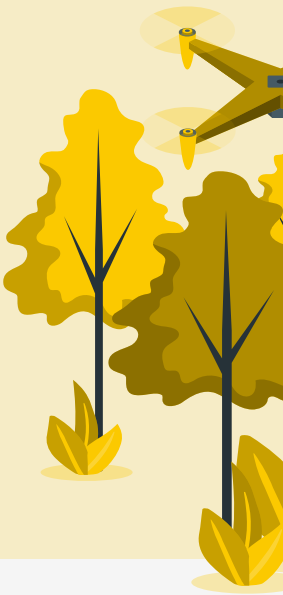
physical-cyber drones ecosystem
agriculture • forestry • environment

Multi-purpose physical-cyber agri-forest drones ecosystem for governance and environmental observation

SPADE aims to create a smart drone ecosystem for agriculture, forestry and livestock farming focusing on:

- Sustainability — studying the environmental and social impacts of drones
- Cost-effective drones — developing a platform and exploring new sensors
- Open data ecosystem — drone platform for data collection and processing
- Pilot deployment — launching 3 pilot programs (agri., forestry, livestock)
- Knowledge sharing — educating and promoting SPADE's innovations

By achieving these goals, SPADE hopes to create a vibrant drone ecosystem that benefits developers, service providers and farmers alike, while promoting sustainable practices.



THE TECHNOLOGY

Forest

SPADE project will conduct innovative drone pilots in the south-eastern Norway covering three cases:

- Drone swarms for forest inventory
- Planting drone in collaboration with inventory drone for automated planting activities enhancing reforestation in forest areas that are isolated and difficult to reach.
- Heavy-lift drones for transporting logs aiming to improve efficiency and minimize environmental impact.

Agriculture

The Open-Field Agriculture pilot will be conducted in Spain targeting potato crops and terraced crops use cases as follows: swarms with regular cameras to monitor crops, collaborative drones for finer inspetion, and large drone for spraying and remote area inspections. The goal is to boost efficiency, reduce costs & promote sustainable agriculture.

Livestock

The Livestock pilot use cases will take place in Greece with the aim of monitoring sheep health, grazing areas, and identifying threats and diseases, boosting milkyield, increasing farmer income and promoting sustainable practices. By combining drone data with AI, SPADE aims to create a smarter, more sustainable future for Greek sheep farms.

ICAERUS

Innovation and Capacity building in Agricultural Environmental and Rural UAV Services

The aim of ICAERUS is to apply, showcase and support the effective, efficient and safe deployment of drones as well as, identify the risks and added values associated with their use. To do so ICAERUS is covering all aspects from research to demonstration, to training and scaleup and will culminate in the ICAERUS platform, which is a single access point for all of the project's results which include:

- An assessment of the drone market landscape
- The drone data analytics library and open access ICAERUS academy
- Socio-economic and environmental impact assessments
- Business and governance models
- Results from the use cases and PUSH and PULL Open Calls

THE TECHNOLOGY

Livestock

Assess drone and camera models adapted to different grassland-based cattle and sheep systems, create and inventory of routines, and assess the impact on drones for livestock monitoring including time and labour savings, decision planning, environmental and socio-economic impact.

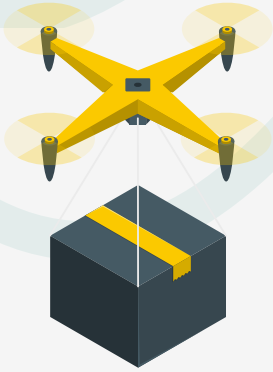
Agriculture

Drone spraying

Test and assess optimal spraying configurations, compare efficiency and environmental impact, and Identify risks, and develop mitigation strategies related to drone-based plant protection applications.

Crop monitoring

Integrate automated solutions for disease detection and map diseased plants.



Forest

Use drones, satellites and data science to monitor forest tree health, Identify and inspect areas of high fire risk, and Monitoring ecosystems and assess biodiversity and wild boar populations.

Rural logistics

Design, develop and deploy a drone-delivery fleet management system that deliver small parcels in remote, inaccessible and rural areas, Implement a cloud-based software, and Modify existing multi-rotor, fixed wing and helicopter drones to meet requirements of different delivery areas

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