SPADE – MULTI-PURPOSE PHYSICAL-CYBER AGRI-FOREST DRONES ECOSYSTEM FOR GOVERNANCE AND ENVIRONMENTAL OBSERVATION

SPADE is a project supported by the European Union under the Horizon Europe programme. The main goal of the project is to create an intelligent ecosystem using unmanned aerial vehicles (UAVs alias drones) to promote sustainable digital services for a wide range of end users in the agricultural, forestry, and livestock sectors.

The project will address the usability of individual UAVs, the application of different UAV types (such as swarm, collaborative, autonomous, and tethered), the availability of UAV governance models, and the reliability of UAV-generated data. Based on learned Artificial Intelligence (AI) and Machine Learning (ML) models, multi-purposes will be further defined in the sensing dataspace reusability. These models will provide digital transformations and "innovation building" services in agriculture to be developed, set up, offered, provided, tested, validated, and refined during the course of their whole life cycle.

To achieve forestry and farming sustainable goals three Pilot Prototypes will be carried out, one for each domain (i.e., forestry, cropping, and livestock farming). The first one is a case study integration in Spain dedicated to spraying applications using all three categories of drones in terraced crops and potato crops. A forestry case study integration done in Southern Norway makes up the second pilot, consisting of a drone swarm for forest inventory, a tethered drone for operational assistance of a wheeled forest harvester, and a heavy-lift drone for carrying out forest operations are the three main tests that will be done. The third project pilot involves the integration of a livestock case study in Greece to promote sheep breeding, and various multi-purpose UAV configurations and apply SPADE platform digital twin services, using AI, IOT, and cloudification solutions.

SPADE started its activities in September 2022 and brings together 21 partners from 10 different European countries with an overall budget of 5.8 M €. The project is coordinated by CERTH and will last 4 years.

Partners

- Centre for Research and Technology-Hellas (CERTH), Greece - **Coordinator**
- Hafenstrom (HAFEN), Norway
- Nydor System Technologies AE (NST), Greece
- University of Southern Denmark (SDU), Denmark
- Fraunhofer-Gesellschaft (FRAUNHOFER), Germany
- Galician Research and Development Center in Advanced Telecommunications (GRADIANT), Spain
- Innovation Portuguese Society (SPI), Portugal
- University of Oulu (UOULU), Finland
- Norwegian Institute of Bioeconomy Research (NIBIO), Norway
- Norwegian University of Science and Technology (NTNU), Norway

- Aristotle University of Thessalonik (AUTH), Greece
- Trialog (TRIALOG), France
- Eclipse Foundation Europe GMBH (ECLIPSE), Germany
- Splorotech SLU (SPLORO), Spain
- Bavenir SRO (BAVENIR), Slovakia
- FarmB Digital Agriculture S.A (FARMB), Greece
- Aarhus University (AU), Denmark
- University of Lincoln, United Kingdom
- Anysolution SL (ANYSOLUTION), Spain
- Mallorcan new potatoes SAT (MNP), Spain
- Sant Bartomeu de Sóller Agricultural Cooperative (CDS), Spain

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