



SPADE

Guideline for applicants

Open Call #2

OPENING: 24 March 2025

CLOSING: 26 May 2025 at 17:00 (CET)

* The deadline for submission is as stated in this Guidelines document. Please note that the platform for submission's time depends on the user's configured time zone and may or may not coincide with the correct time (this depends on the user, not the platform for submission). Any discrepancies in system time will not be grounds for deadline extension.

Project Website: <https://spade-horizon.eu/>

Open Call platform: https://bit.ly/SPADE_OC2_Applicants

All the Open Call documents and templates available for download at

<https://spade-horizon.eu/open-call-2-applicants/>

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V3.0 21/03/2025



List of Acronyms

OC	OPEN CALL
FIF	FINANCIAL IDENTIFICATION FORM
UAV	UNMANNED AERIAL VEHICLES
UCU	UNIVERSAL CONSIDERATIONS ACROSS CASE STUDIES
UCU-CH1	UNIVERSAL CONSIDERATIONS ACROSS CASE STUDIES CHALLENGE 1
UCU-CH2	UNIVERSAL CONSIDERATIONS ACROSS CASE STUDIES CHALLENGE 2
UCU-CH3	UNIVERSAL CONSIDERATIONS ACROSS CASE STUDIES CHALLENGE 3
CStudy1	CASE STUDY 1: OPEN-FIELD CASE STUDY INTEGRATION
CStudy1-CH1	CASE STUDY 1. CHALLENGE 1
CStudy1-CH2	CASE STUDY 1. CHALLENGE 2
CStudy2	CASE STUDY 2: FORESTRY CASE STUDY
CStudy2-CH1	CASE STUDY 2. CHALLENGE 1
CStudy2-CH2	CASE STUDY 2. CHALLENGE 2
CStudy3	CASE STUDY 3: LIVESTOCK CASE STUDY INTEGRATION
CStudy3-CH1	CASE STUDY 3. CHALLENGE 1
CStudy3-CH2	CASE STUDY 3. CHALLENGE 2

List of definitions

USE CASE	SPECIFIC CONDITIONS THAT ARE INHERENTLY TIED TO A PARTICULAR COUNTRY OR GEOGRAPHIC AREA REFER TO THE UNIQUE ENVIRONMENTAL, REGULATORY, CULTURAL, AND OPERATIONAL FACTORS OF A LOCATION THAT DIRECTLY INFLUENCE THE APPLICATION OF DRONE TECHNOLOGY IN FORESTRY, LIVESTOCK MANAGEMENT, OR OPEN-FIELD AGRICULTURE.
CASE STUDY	A PRACTICAL APPLICATION SCENARIO FROM A USE CASE.
CHALLENGE	A COMPLEX SITUATION IN OPEN FIELDS, LIVESTOCK, OR FORESTRY THAT REQUIRES INNOVATIVE PROPOSALS FROM APPLICANTS, DESIGNED TO ADDRESS SPECIFIC ISSUES WHILE CONSIDERING THE UNIQUE CONSTRAINTS, OPPORTUNITIES, AND CHARACTERISTICS OF A DEFINED CASE STUDY.

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1. Introduction

1.1 About SPADE project

SPADE is a project funded by the European Union under the Horizon Europe program through the HORIZON-CL6-2021-GOVERNANCE-01 call. SPADE comprises a consortium of 21 partners from 9 European countries and 1 associated country.

Initiated in September 2022, this project is scheduled to span a duration of 4 years and is under the coordination of the Centre for Research and Technology Hellas (CERTH) in Greece.

1.2 Objectives and Ambition of SPADE

The strategic objective of SPADE project is to develop an intelligent ecosystem to address the multiple purposes concept in the light of deploying unmanned aerial vehicles (UAVs alias drones) to promote sustainable digital services for the benefit of a large scope of end users in sectors of crop production, forestry, and livestock. This includes individual UAV usability, UAV type applicability (e.g., swarm, collaborative, autonomous, tethered), UAV governance models availability and UAV-generated data trustworthiness. Multi-purposes will be further determined in the sensing dataspace reusability based on trained Artificial Intelligence (AI)/Machine Learning (ML) models. These models will enable sustainability and resilience of the overall life cycle of developing, setting up, offering, providing, testing, validating, refining as well as enhancing digital transformations and “innovation building” services in agriculture. Pilot prototypes will contribute toward greater goals, such as the reduction of deforestation, precision farming and animal welfare.

Three pilot prototypes, each related to one of three case studies—forestry, open-field agriculture, and livestock farming—along with two Open Calls supporting up to 12 complementary small projects, will contribute towards the goals of sustainable forestry and farming. These guidelines pertain to the second and final Open Call.

1.3 SPADE Approach

The SPADE project will take a multifaceted approach. First, it will create a digital ecosystem to address the multipurpose character of UAVs improving the accessibility and control of drone operations, making it easier to utilize UAVs effectively. This platform will also serve as a channel for value-added services enabled by drones. Second, SPADE will showcase three innovative case studies for drones, analysing and quantifying the benefits at a detailed stakeholder level. These demonstrations will not only reveal new business opportunities but also help in examining the regulatory framework at both international and national levels.

1.4 SPADE Open Call#2

SPADE is excited to announce the launch of Open Call #2, with a total budget of **€525,000**, funding **eight innovative projects with €60,000 each** and **one project with €45,000**. This Open Call is a significant part of SPADE's commitment to driving innovation in the field of drones for agriculture and forestry. In the following sections, detailed information about the Open Call#2 is provided.



2. SPADE Open Call #2: Open Innovation for Agriculture Drone Technology Advancement.

To cultivate a dynamic and thriving ecosystem in the agricultural drone technology sector, SPADE will launch an Open Call for innovative solutions to identify and fund nine of the most promising and ambitious challenges that will enhance the capabilities of drone technology. To be eligible for funding through the SPADE Open Call, applicants must align their solutions with one of the challenges outlined within the three distinct SPADE Case Study groups:

- 1. Open-Field Case Study Integration (Spain):** The open-field case study in Spain primarily focuses on distinct use cases in Mediterranean crops.
- 2. Forestry Case Study integration (Norway):** In Southern Norway SPADE will implement three forestry-based use cases: (1) a drone swarm for forest inventory, (2) collaborative case for forest inventory and planting activities, and (3) a heavy-lift drone for implementing forest operations.
- 3. Live-stock Case Study integration (Greece):** The primary objective is to enhance and promote sheep breeding through grazing and health monitoring on the Greek island of Lesvos. It will utilize multi-purpose UAVs in various configurations, synchronized with SPADE platform digital twin services.

2.1 Addressing Case Study Challenges

SPADE's Open Call#2 is designed to invite applicants who can provide innovative solutions to address the specific challenges presented by each of our three distinct Case Studies.

Furthermore, in addition to the specific challenges of each Case Study, there are three overarching challenges that apply universally across all of SPADE's Case Studies initiatives. These general challenges have the potential to shape the landscape of drone technology.

SPADE seeks to select and finance **one project for each challenge**, ensuring that the selected solutions align with our mission to enhance and promote sustainable and efficient practices in agriculture through the power of drone technology. More information on the challenges can be found in section 3 of this document.

2.2 Key Details

Total Budget: The SPADE Open Call #2 has a total budget of **525,000 EUR**, which will be allocated to support pioneering projects that align with our mission to advance agriculture and forestry drones.

Project Duration: Each selected project will have a duration of 6 months.

Maximum Support to Third Parties: Eight projects can receive a maximum budget of **60,000 EUR each**, while one project can receive a maximum budget of **45,000 EUR**.



2.3 Relevant Dates

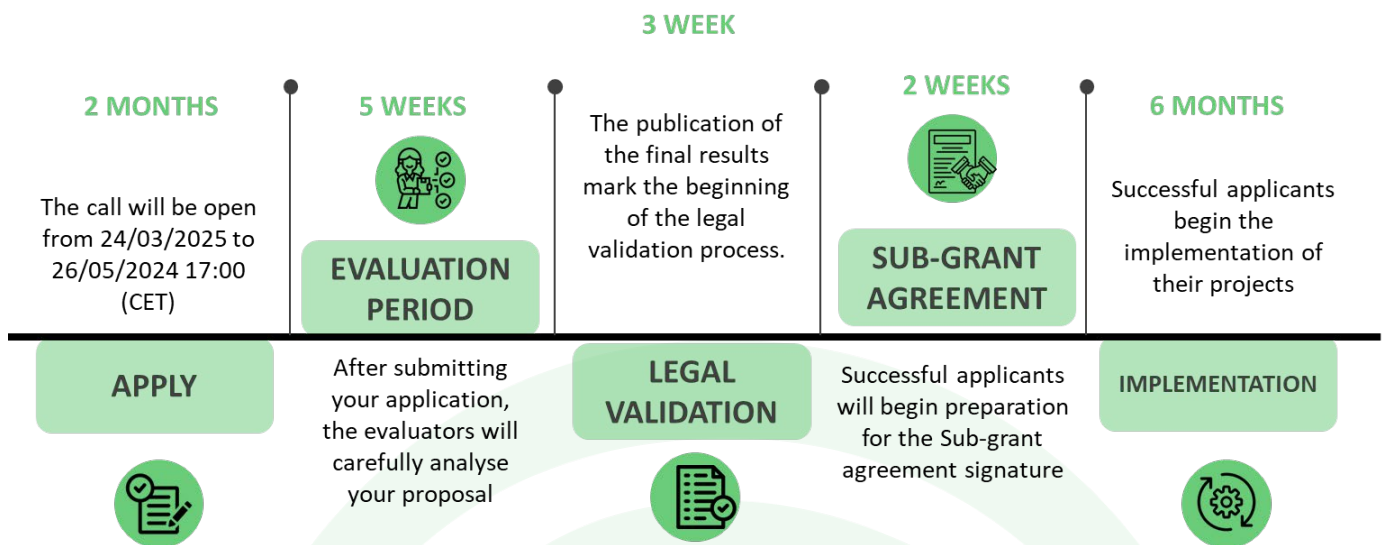


Figure 1. Lifecycle of a funded proposal.

2.3.1 Applications

- Opening: **24.03.2025**
- Deadline for submission: **26.05.2025, 17:00h (CET)***

* The deadline for submission is as stated in this Guidelines document. Please note that the platform for submission's time depends on the user's configured time zone and may or may not coincide with the correct time (this depends on the user, not the platform for submission). Any discrepancies in system time will not be grounds for deadline extension.

- Apply: via the [SPLORO platform](#)

2.3.2 Evaluation

- Evaluation period: Indicatively period to evaluate potential applicants. **27.05.2025 to 04.07.2025**
- Communication of results to applicants: The evaluation results will be communicated to the applicants around 04.07.2025.
- Legal validation and Sub-grant agreement will be held during July 2025. Legal validation is applied exclusively to successful applicants and involves the submission of various documents to ensure compliance with the requirements of the SPADE project.

To obtain further information about the evaluation process, kindly refer to Section 6 in this document.

3. Challenges of Open Call #2

SPADE is following a comprehensive programme that encompasses specific challenges in the domains of Open-Field Case Study in Spain, Forestry Case Study in Norway, and Livestock Case Study in Greece. Through this call, we invite applicants to tackle tailored challenges for each Case Study, along with three Universal challenges, promoting innovation in agricultural practices, forestry management, and livestock breeding.

Refer to the graphic below (Figure 2) for a visual representation of the call’s structure, outlining the unique challenges associated with each case and the universal considerations that unite them.

It is important to note that all solutions must integrate into the SPADE ecosystem. For more details, please refer to the Technical Annex ([Annex 1](#)).

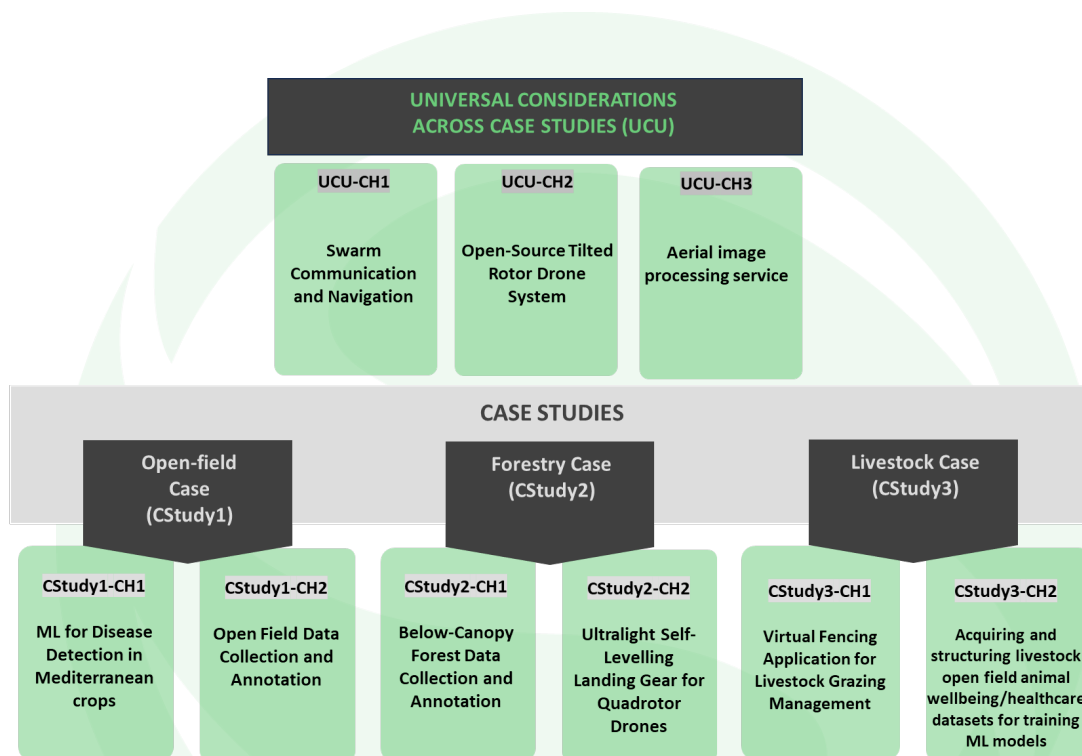


Figure 2. SPADE OC#2. Challenges.

3.1 Universal consideration across case studies (UCU)

3.1.1 UCU-CH1: Swarm Communication and Navigation

This challenge focuses on the development of a system for the communication and navigation of drone swarms for mapping. The primary goal is to create an effective solution that enables multiple drones to work to survey an area using LiDAR. A central computer will assemble the incoming sensor data into a detailed map, while sending navigational commands to the swarm drones to complete the map. Decentralized swarm approaches are also acceptable. Participants will be tasked with:

- Developing robust inter-drone communications, allowing for reliable control and relaying of sensor data.
- Assembling a global map based on point-cloud data incoming from swarm drones.
- Sending navigational commands to the drone participants to complete the map.

The aim is to optimize the integration of the system with the existing drone fleet, maximizing its performance and efficiency.

The proposal must consider the following deliverables for the project's development. For specific technical details regarding implementation and requirements, consult the Technical Annex.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6
UCU-CH1: Drone Swarm Navigation Prototype	System for efficient communication and navigation of drones in a group.	Initial Report	Algorithm prototype demonstration	System testing and validation
			Preliminary codebase delivery	Codebase delivery
			Interim Report	Final Report

Month 1 deliverables

- **Initial Report:** An initial report should describe the planned methodologies, timelines, as well as key performance indicators (KPI) used throughout the project.
- **From day-1,** all software components must be open source and developed transparently on the SPADE Research Labs infrastructure to ensure community access and contribution

Month 3 deliverables

- **Algorithm prototype:** An initial version of the developed algorithm must be presented and demonstrated. At this stage, all main components of the algorithm should be in place, but minor components may be lacking. Demonstration can be performed in a simplified environment but should demonstrate basic control and connection between a central computer and at least 2 drones.
- **Preliminary control codebase:** A preliminary design of the codebase should be presented for review.
- **Interim report:** Interim report should describe the system's mechanical and electrical design, planned levelling system, and preliminary testing. Remaining work and timelines should be detailed.

Month 6 deliverables

- **System testing and validation:** The developed system should be implemented on the small drones developed by SDU and validated by successfully navigating a drone swarm in mapping out an open forest environment.



- **Codebase delivery:** Full codebase must be made open source and be thoroughly documented with user manuals, and maintenance guidelines.
- **Final Report:** Final report must document the developed method and modules. It should report on system testing and KPIs fulfilment.

The selected proposal will receive a sub-grant of **up to 60,000 EUR** for the entire project, distributed in tranches as specified in Section 7.

For specific technical details regarding the implementation and requirements, it is recommended to refer to the [Technical Annex \(Annex 1- Section 3.1.1\)](#). This document provides detailed information to guide participants in the completion of this challenge in swarm communication and navigation.

3.1.2 UCU-CH2: Open Source Tilted Rotor Drone System.

The challenge aims to develop an open source omnidirectional navigation system using a tilted rotor drone. This system will enable smooth, precise 360-degree movement, utilizing advanced hardware and software integration. The project emphasizes open source principles, delivering functional hardware, software, and comprehensive documentation to foster innovation and accessibility.

Solutions will require to develop a fully functional omnidirectional drone featuring efficient tilted rotor hardware, a vectored thrust controller integrated with PX4, onboard computing for real-time coordination, and comprehensive open source documentation.

Applicants are asked to:

1. Design, build, and integrate hardware and software components, including tilted rotors, vectored thrust control, and onboard computing for seamless omnidirectional navigation.
2. Deliver and validate a functional drone system with open source documentation and manuals for replication, modification, and future development.

The aim of this challenge is to create a scalable, adaptable platform for omnidirectional flight. By leveraging open source accessibility, the project seeks to empower innovation in drone technology and contribute to the SPADE project with a robust and versatile drone system.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6
UCU-CH2: Open Source Tilted Rotor Drone System	A drone able to interact with the environment in 360 degrees.	Initial Report	Working prototype in the lab	Prototype tested in realistic environment
			Interim Report	Documentation of the open source hardware and software Final Report



Month 1 deliverables

- **Initial Report:** An initial report should describe the planned methodologies, timelines, as well as key performance indicators (KPI) used throughout the project.
- **KPIs shall be discussed with the SPADE representative.**
- **From day-1**, all software components must be open source and developed transparently on the SPADE Research Labs infrastructure to ensure community access and contribution.

Month 3 deliverables

- **Interim report:** Report on the fulfilment of KPIs for the mid-term review.
- **A video showing the drone test in lab environment.**

Month 6 deliverables

- **Final report:** Report on the fulfilment of KPIs for the final review.
- **A video showing the drone tested in an outdoor setup.**
- **Codebase delivery:** Full codebase must be made open source and be thoroughly documented with user manuals, and maintenance guidelines.

The selected proposal will receive a sub-grant of up to **60,000 EUR** for the entire project, distributed in tranches as specified in Section 7.

To obtain more technical details regarding the implementation and specific requirements, we invite applicants to consult the [Technical Annex \(Annex 1- Section 3.1.2\)](#).

3.1.3 UCU-CH3: Aerial image processing service.

To develop and deploy an Open Source AWS-based system that is capable of processing photogrammetry data from drones and exporting orthomosaics of varying resolutions based on user preferences. The system should support multiple data outputs, and connection with Management Information Systems.

The solution should include:

- APIs for image upload, processing, and data download
- Photogrammetry data processing tools to process drone-captured photogrammetry data efficiently.
- Orthomosaic generation functionality to generate high-quality orthomosaics online with varying resolutions based on user preferences. The service should have the ability to process RGB, Thermal, and multispectral images.
- Images radiometric calibration capabilities.
- Capabilities for integrating with third-party microservices for data storage and further analysis.



- User-friendly interface: An intuitive interface for users to manage data, customize resolutions, and access analysis tools.
- Scalability and performance based on a scalable system that can handle large datasets and deliver fast processing and visualization.
- Secure data handling and storage to protect sensitive information.
- Intuitive admin panel that provides the ability to control all the above features in tandem with the essential tools to monitor the service

The proposal must consider the following deliverables for the project's development.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6
UCU-CH3: Aerial image processing service	To develop a comprehensive and scalable AWS-based system that enables online processing of drone-captured photogrammetry data into customizable orthomosaics.	Initial Report	Beta version	Final version
			Interim Report	Final Report

Month 1 deliverables

- **Initial Report:** An initial report should describe the requirements, planned methodologies, timelines, milestones as well as key performance indicators (KPIs) used throughout the project.
- Requirements documentation, risk assessment report, detailed project plan.
- **From day-1**, all software components must be open source and developed transparently on the SPADE Research Labs infrastructure to ensure community access and contribution

Month 3 deliverables

- **Interim report:** Report on the fulfillment of KPIs and milestones for the mid-term review. Updated risk assessment and any changes to the project plan.
- **Basic Software Prototype:** An initial version of the software demonstrating the ability to export files in various formats. Demonstration of initial orthomosaic generation capabilities. Feedback from early testing phases and proposed adjustments.
- AWS infrastructure setup, initial FMIS connection.
- Image upload API with support for radiometric calibration.



Month 6 deliverables

- **Full Software Version:** Fully functional software that meets all requirements, including orthomosaics generation and file export.
- **Codebase delivery:** Full codebase must be made open source and be thoroughly documented with user manuals, and maintenance guidelines.
- Image processing module, including orthomosaic creation and multiple data outputs.
- Data download API, authentication mechanisms, third-party microservice integration.
- **Final report:** Report on the fulfillment of KPIs for the final review. Complete documentation Performance evaluation results Recommendations for future improvements and potential expansions.

The selected proposal will receive a sub-grant of up to **60,000 EUR** for the entire project, distributed in tranches as specified in Section 7.

For specific technical details regarding the implementation, hardware, and software used, it is recommended to refer to the [Technical Annex \(Annex 1- Section 3.1.3\)](#).

3.2 Case Study. Challenges (CStudy)

3.2.1 CStudy1: Open-field case study integration.

SPADE aims to address the complex challenges facing the agricultural sector, particularly those related to environmental sustainability and socio-economic factors. With a focus on leveraging drone technology, SPADE aims to conduct thorough testing and analysis in the Balearic Islands, Spain.

The objectives of the open-field case study include:

- evaluating the application of drones in fruit and crop farming,
- streamlining tasks for farmers in the fields, and
- providing valuable insights for agronomic decision-making in the management of fields and crops.

To achieve these objectives, intuitive and user-friendly tools are required for the accurate processing and analysis of data and images captured by the drones.

3.2.1.1 CStudy1-CH1: ML-based disease detection in Mediterranean crops

To explore innovative applications of machine learning (ML) for disease detection on plants and crops, primarily focusing on olive groves, citrus trees and potatoes. Analyse large datasets to identify patterns, predict outbreaks, and enhance diagnostic accuracy to improve crop health and agricultural sustainability.

The solution should be able to analyse orthomosaic maps and raw images (RGB and multispectral images) of olive groves, citrus trees and potato crops in the Mediterranean region. Based on these maps and images, the ML model and algorithms to be developed, shall support end-users in the detection of specific plagues and diseases. More specifically:

- In the case of potato crops, detection shall focus on a fungi called *Alternaria* (also called “potato early blight” in English). Two specific species will need to be covered: *Alternaria solani* and *Alternaria alternata*.
- In the case of mediterranean fruit farming (olive and citrus trees), detection shall focus on the “olive leaf spot” disease (called *repilo* in Spanish - *Fusicladium oleagineum*).



Both disease (whether *Alternaria* or *Repilo*), are foliar diseases that primarily cause a decrease in yield due to the loss of photosynthetic leaf area.

In this context, participants are tasked with the development of ML algorithms using the ML techniques (supervised learning, unsupervised learning, gradient descent, regularization...) and generate ML models (linear regression model, decision tree model, convolutional neural network (CNN), random forest, ...).

Participants will be required to demonstrate that the produced ML model can run in the SPADE ML infrastructure developed through SPADE's Open Call #2. Relevant documentation will be provided by the ML infrastructure developers.

The resulting ML model should also be able to intuitively inform end-users on the detection, localization (but also potential occurrence) of the diseases. The visualization of results should be reflected through a “heat map” of the fields and crops, indicating the affected areas jointly with an estimation of the level/importance of the diseases.

The resulting application for diseases detection from this challenge should also work as a standalone version. As such, participants will be required to build an installation package and executable application for end-users to run directly the disease detection models on their local machines. This standalone version shall be able to run on Windows and Linux operating systems.

The aim is to enhance agricultural disease management by unlocking the full potential of drone technology and Machine Learning, so to improve and fasten the early detection of diseases in Mediterranean crops.

The proposal must consider the following deliverables for the project's development.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6
CS1-CH1: ML-based disease detection in Mediterranean crops		Initial Report		
			Interim Report	Final Report

Month 1 deliverables

- **Initial Report:** An initial report should describe the planned methodologies, timelines, as well as key performance indicators (KPI) used throughout the project.
- The report shall specify the algorithms functional analysis, Machine Learning Model and ML Technique that will be used for diseases' detection.

Month 3 deliverables

- **Interim report:** Report on the fulfilment of KPIs for the mid-term review.



- A first prototype of the algorithms should be showcased to assess their accuracy for disease detection model based on defined techniques.

Month 6 deliverables

- **Final report:** Report on the fulfilment of KPIs for the final review.
- The complete solution for detection and reporting of the two specific diseases (Alternaria and Repilo)

The selected proposal will receive a sub-grant of up to 60,000 EUR for the entire project, distributed in tranches as specified in Section 7.

To obtain more technical details regarding the implementation and specific requirements, we invite applicants to consult the [Technical Annex \(Annex 1- Section 3.2.1.1\)](#).

3.2.1.2 CStudy1-CH2: Open Field Data Collection and Annotation

Acquiring and structuring open field crop datasets for training cloud-based ML models tailored to at least two focused applications. The contractor should secure access to several fields for the data acquisition.

The challenge is set within the context of the Open Field Case in the SPADE project and supports the creation of comprehensive segmented datasets of georeferenced aerial images acquired using UAV(s) with RGB, thermal, multispectral or hyperspectral cameras.

The solution should include comprehensive steps to create a high-quality, annotated dataset from drone-captured images acquired from different fields. It involves data collection, preprocessing, annotation, structuring, and validation, all aimed at providing a solid foundation for training a ML model focused to solve specific issues in crop production. The issues of interest include weed detection, plant/trees species identification and counting, tree canopy coverage estimation, field area segmentation and objects identification at different crop types (grapevines, orchards, arable crops that are common in the mediterranean regions).

The challenge will develop two different open source datasets addressing different crops.

The aim is to collect and annotate both raw tiff data and orthomosaics and create an online open dataset that will facilitate machine learning algorithm training. Each dataset should include UAV aerial images of the same crop at multiple growth stages taken at different heights depending on the dataset and crop specifications. The dataset along with a detailed documentation will be made Open Source.

Applicants must have extensive experience in labelling /annotating agricultural data to ensure quality of annotation.

For specific technical details regarding implementation and requirements, consult the Technical Annex.

The proposal must consider the following deliverables for the project's development.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6
CS1-CH2: Crop Data Collection and Annotation	Collect and annotate geospatial aerial image datasets	Initial Report	Local dataset (unlabelled)	Labelled dataset and documentation delivery
			Interim labelled dataset	
			Interim Report	Final Report

Month 1 deliverables

- **Initial Report:** An initial report should describe the planned methodologies, timelines, as well as key performance indicators (KPI) used throughout the project.

Month 3 deliverables

- **Local dataset:** The locally collected image dataset should be delivered for preliminary review.
- **Interim dataset for review:** Approximately 50% of the total data should be collected. A significant proportion of the image datasets should be labelled and delivered for preliminary review.
- **Interim report:** Interim report should detail the fulfilment of KPIs for the mid-term review, describe the progress of the data collection and annotation tasks and provide the initial datasets in the Open repository. Remaining work and timelines should be detailed.

Month 6 deliverables

- **Dataset delivery:** The full image and dataset must be made open source and thoroughly documented.
- **Final Report:** Final report must document the collected datasets, annotation, and segmentation and report on KPI fulfilment.

The selected proposal will receive a sub-grant of up to **45,000 EUR** for the entire project, distributed in tranches as specified in Section 7.

For specific technical details regarding the implementation, hardware, and software used, it is recommended to refer to the [Technical Annex \(Annex 1- Section 3.2.1.2\)](#).



3.2.2 CStudy2: Forestry Case Study

The forestry case study within the SPADE project represents a significant step towards the broader and more efficient use of Unmanned Aerial Vehicles (UAVs) in the forestry sector. This innovative approach aims to analyse and test the use of drones in three specific use cases, all located in the southeastern part of Norway.

This case study not only seeks to improve operational efficiency and sustainability in forestry management but also to set a precedent for the widespread application of advanced technologies in the forestry industry. As SPADE progresses in the analysis and testing of drone use in this context, it is expected to contribute significantly to the sustainable future of the forestry sector in Norway and beyond.

3.2.2.1 CStudy2-CH1. Below-Canopy Forest Data Collection and Annotation

The challenge “Below-Canopy Forest Data Collection and Annotation” within the context of the Forestry Case in the SPADE project supports the creation of a comprehensive European forestry dataset, for use in training AI algorithms. The goal of this challenge is to annotate and collect below-canopy image/video and point cloud (LiDAR) datasets from forests throughout Europe. Applicants will be provided with datasets to annotate and segment, and the applicant will also be required to collect data forest local to their region using a data acquisition module developed in SPADE. This challenge aligns with the overarching vision of the SPADE project, aiming to advance sustainable digital solutions in forestry management. Applicants must show they have experience labelling annotating forest sensor data to ensure quality of annotation.

For specific technical details regarding implementation and requirements, consult the Technical Annex.

The proposal must consider the following deliverables for the project's development.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6
CS2-CH1: Below-Canopy Forest Data Collection and Annotation	Collect and annotate below-canopy forest image and LiDAR datasets	Initial Report	Local (unlabelled) dataset	Labelled delivery dataset
			Interim dataset labelled	
			Interim Report	Final Report

Month 1 deliverables

- Initial Report:** An initial report should describe the planned methodologies, timelines, as well as key performance indicators (KPI) used throughout the project.



Month 3 deliverables

- **Local dataset:** The locally collected image and point cloud dataset should be delivered for preliminary review.
- **Interim dataset for review:** Approximately 30% of the total data from the image and point cloud datasets to be labelled should be delivered for preliminary review.
- **Interim report:** Interim report should describe the system’s mechanical and electrical design, planned levelling system, and preliminary testing. Remaining work and timelines should be detailed.

Month 6 deliverables

- **Dataset delivery:** The full image and point cloud dataset must be made open source and thoroughly documented.
- **Final Report:** Final report must document the collected datasets, annotation, and segmentation and report on KPI fulfilment.

The selected proposal will receive a sub-grant of up to **60,000 EUR** for the entire project, distributed in tranches as specified in Section 7.

For specific technical details regarding implementation and requirements, we recommend consulting the [Technical Annex \(Annex 1- Section 3.2.2.1\)](#). This document will provide detailed information and guidance for those interested in participating in this strategic challenge, contributing to technological advancement in the use of drones in the forestry sector.

3.2.2.2. CStudy2-CH2. Ultralight Self-Levelling Landing Gear for Quadrotor Drones

The challenge “Ultralight Self-Levelling Landing Gear for Quadrotor Drones” within the context of the Forestry Case in the SPADE project addresses the issue of take-off and landing of quadrotor drones in rough or uneven terrain. The goal of this challenge is to develop ultra-lightweight drone legs capable of linearly adjusting their height to level the drone. The proposed design should be a scalable solution that can be adapted to a variety of quadrotor sizes. Applicants will be required to validate their design by implementing the system for two SPADE drones, a medium-sized quadrotor (500 mm wingspan, 26 kg leg load capacity) and large seedling-planting drone (1300 mm wingspan, 60 kg leg load capacity).

This challenge aligns with the overarching vision of the SPADE project, aiming to advance

For specific technical details regarding implementation and requirements, consult the Technical Annex.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6



CS2-CH2: Ultralight Self-Leveling Landing Gear for Quadrotor Drones	Develop ultra-light adaptive landing gear system for drones.	Initial Report	Preliminary design documents	System testing and validation
			Preliminary codebase	Codebase delivery
			Interim Report	Final Report

Month 1 deliverables

- **Initial Report:** An initial report should describe the planned methodologies, timelines, as well as key performance indicators (KPI) used throughout the project.
- **From day-1,** all software components must be open source and developed transparently on the SPADE Research Labs infrastructure to ensure community access and contribution.

Month 3 deliverables

- **Preliminary design documents:** Full preliminary mechanical and electrical design documents for the two drone landing gear solutions must be completed, with full specifications for manufacturing. However, physical hardware is not required at this point.
- **Preliminary control codebase:** A preliminary design of the codebase should be presented, showing the strategy used to level the drone given lidar scan data from below the drone, and the drone’s own IMU data.
- **Interim report:** Interim report should describe the system’s mechanical and electrical design, planned levelling system, and preliminary testing. Remaining work and timelines should be detailed.

Month 6 deliverables

- **System testing and validation:** The developed system must be connected to the two SPADE drones and validated by successfully taking off and landing while maintaining the drone body horizontal on an uneven terrain.
- **Codebase delivery:** Full codebase must be made open source and be thoroughly documented with user manuals and maintenance guidelines
- **Final Report:** Final report must document the developed method and modules. It should report on system testing and KPIs fulfilment.

The selected proposal will receive a sub-grant of up to **60,000 EUR** for the entire project, distributed in tranches as specified in Section 7.

For specific technical details regarding implementation and requirements, we recommend consulting the [Technical Annex \(Annex 1- Section 3.2.2.2\)](#). This document will provide detailed information and guidance for those interested in participating in this strategic challenge, contributing to technological advancement in the use of drones in the forestry sector.



3.2.3 CStudy3: Livestock Case Study Integration

The Livestock Case Study in Lesvos, within the SPADE project, focuses on the implementation of drone technology to enhance livestock management on the Greek island. With a substantial sheep population and mountainous terrain, the primary goal is to utilize multipurpose drones for monitoring health, grazing, and managing environmental risks.

These drones, supplied by project partners, will be equipped with advanced sensors and cameras, including artificial intelligence (AI) and machine learning (ML) technologies. The case study spans from early detection of diseases in livestock to surveillance of grazing areas, providing a comprehensive approach to improving productivity and sustainability in sheep farming on Lesvos.

3.2.3.1 CStudy3-CH1: Virtual Fencing Application for Livestock Grazing Management

The goal is to develop a virtual fence thresholding application for targeted grazing management.

The solution should include an environment that utilises the SPADE Livestock Platform (SLP), a Parrot Anafi USA UAV or a UAV provided by SPADE project, and animal commercial collar transceivers or transceivers provided by the SPADE project.

In this context, participants are tasked with activities that are expected to produce a prototype subsystem achieving to monitor livestock trespassing, dynamically defined, virtual fences, and collect relevant data via SLP regarding the trespassing events.

The aim is to deliver a validated solution in a real-world landscape on agreed by SPADE, during the Design Document deliverable stage, user scenarios. The contractors must secure access to a livestock farm for testing their solution.

The proposal must consider the following deliverables for the project's development.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6
CS3-CH1: Virtual Fencing Application for Livestock Grazing Management	Develop a virtual fence thresholding application for targeted grazing management through existing SPADE modules (SPADE Livestock Platform (SLP), Parrot Anafi USA UAV and animal collars)	Initial Report	Landscape Detection and Virtual Fence Setup with Waypoint Tracking and UAV Flight Control	Real world testing and validation
			Grazing Area Thresholding and Monitoring with Parrot Land SDK and Skycontroller	
			Interim Report	Final Report



Month 1 deliverables

- **Initial Report:** An initial report should describe the planned methodologies, timelines, as well as key performance indicators (KPI) used throughout the project. Moreover, should include a Design Document with specific user scenarios as well as livestock farm access and setup (documentation confirming that the participants have secured access to a real livestock farm where data can be collected, along with permissions for using drones for data capture, farm and animal details, etc)

Month 3 deliverables

- **Landscape Detection and Virtual Fence Setup with Waypoint Tracking and UAV Flight Control.** Landscape conditions detection and identification of grazing areas and placing virtual fence zones. Target waypoint detection with the use of the provided wearable device. Parrot UAV flight planning using the provided Waypoint. Switching to Manual flying mode using Skycontroller when needed.
- **Grazing Area Thresholding and Monitoring with Parrot Land SDK and Skycontroller.** Grazing area thresholding with the use of Parrot Land SDK and laptop interfacing Parrot Skycontroller. Flying along the threshold line and monitoring grazing animals.
- **Interim report:** Report on the fulfilment of KPIs for the mid-term review.

Month 6 deliverables

- **Real world testing and validation.** The solution should be validated against user scenarios as defined during the Design Document deliverable stage. These scenarios may include grazing land thresholding: While monitoring grazing animals, fly along a virtual fencing zone, and develop SPADE datasets on SLP. The deliverable should also document the results of field testing, including the effectiveness of the virtual fence in managing grazing, the accuracy of GPS tracking and alerts, and any issues or improvements identified during testing.
- **Final report:** Report on the fulfilment of KPIs for the final review

The selected proposal will receive a sub-grant of up to **60,000 EUR** for the entire project, distributed in tranches as specified in Section 7.

For specific technical details regarding implementation and requirements, we recommend consulting the [Technical Annex \(Annex 1- Section 3.2.3.1\)](#).

3.2.3.2 CStudy3-CH2: Acquiring and structuring livestock open field animal wellbeing/healthcare datasets for training ML models

Acquiring and structuring livestock open field animal wellbeing/healthcare datasets for training cloud-based ML models tailored to provide above 80% accuracy for at least one focused animal vector-disease variation. The contractor should secure access to a real livestock farm.

The solution includes comprehensive steps to create a high-quality, annotated dataset from drone-captured images and videos in a livestock farm. It involves data collection, preprocessing, annotation, structuring, and validation, all aimed at providing a solid foundation for training a livestock disease detection model with above 80% accuracy for at least one focused animal vector-disease variation.

In this context, participants are tasked with providing secure access to a real livestock farm for capturing, annotating, structuring, and preparing high-quality image and video datasets of livestock for the purpose of training machine learning models for disease detection. This includes ensuring accurate disease labelling, comprehensive data collection, and preparation of the dataset in a format that can be used to develop models with the potential for real-world applications in livestock health monitoring and disease management.



The aim is to acquire, structure, and annotate high-quality datasets from real livestock farm for the purpose of training machine learning models. These models will be tailored to detect livestock diseases from images and videos captured by drones, with the goal of improving animal health management and early disease detection in livestock.

The proposal must consider the following deliverables for the project's development.

		Deliverables		
Challenge	Objective	Month 1	Month 3	Month 6
CS3-CH2: Livestock Data Acquisition and ML Model Development	Creating an annotated dataset for livestock disease detection from images and videos captured by drones that will serve as a solid foundation for training a livestock disease detection model.	Initial Report	Data collection	Pre-processed Data
			Annotated dataset	Dataset Documentation
			Interim Report	Final Report

Month 1 deliverables

- **Initial Report:** An initial report should describe the planned methodologies, timelines, as well as key performance indicators (KPI) used throughout the project. Moreover, should include livestock farm access and setup (documentation confirming that the participants have secured access to a real livestock farm where data can be collected, along with permissions for using drones for data capture, farm and animal details, etc)

Month 3 deliverables

- **Data collection.** The data collection deliverable includes a) Captured Images and Videos: High-resolution images and videos of livestock captured from drones, covering various scenarios (e.g., healthy animals, animals showing disease symptoms, different weather conditions, and varied environments), b) Environmental Data: Metadata accompanying the images and videos, including time, GPS coordinates, weather conditions, and other relevant contextual details.
- **Annotated dataset.** A dataset of annotated images and video frames, with clear labelling of livestock diseases and visible symptoms, such as a) Disease classifications (e.g., foot-and-mouth disease, tick infestations, respiratory illnesses), b) Bounding boxes or segmentation masks around areas with visible symptoms (e.g., skin lesions, abnormal behaviour), c) Labels for different disease stages or severity (if applicable). The dataset should be structured in a widely used format (e.g., COCO, Pascal VOC) for easy integration with machine learning algorithms.
- **Interim report:** Report on the fulfilment of KPIs for the mid-term review.

Month 6 deliverables

- **Pre-processed Data.** An augmented version of the dataset, created through various preprocessing techniques (e.g., flipping, rotating, scaling images) to enhance the dataset's diversity and support robust model training.
- **Dataset Documentation.** Detailed documentation explaining how the dataset was annotated, including the criteria used for disease identification, labelling conventions, and handling of ambiguous cases. Clear documentation for each data entry, including animal information, environmental conditions, and disease classification.
- **Final report:** Report on the fulfilment of KPIs for the final review.

The selected proposal will receive a sub-grant of up to **60,000 EUR** for the entire project, distributed in tranches as specified in Section 7.

For specific technical details regarding implementation and requirements, we recommend consulting the [Technical Annex \(Annex 1- Section 3.2.3.2\)](#).

3.3 Technology Readiness Level (TRL)

In the context of the SPADE project, the Technology Readiness Level (TRL) plays a significant role in evaluating the maturity of proposed solutions.

Applicants have the flexibility to determine the TRL at which they will initiate and aim to reach throughout the project; however, it is crucial to consider that challenges involving operational risks, such as swarm navigation and control, may require higher TRLs.

The selection process will prioritise proposals that align with SPADE's objectives, demonstrating technological feasibility and the potential to contribute to the sustainability and resilience of UAV deployment and digital services in agriculture and forestry.

In SPADE, only the definition of TRL levels according to the [European Commission](#) will be considered.

TRL 1 – basic principles observed

TRL 2 – technology concept formulated

TRL 3 – experimental proof of concept

TRL 4 – technology validated in lab

TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)

TRL 6 – technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)

TRL 7 – system prototype demonstration in operational environment

TRL 8 – system complete and qualified

TRL 9 – actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)



4. Eligibility criteria

This section presents the eligibility criteria for applicants of SPADE's Open Call#2.

4.1 Eligible countries

Only applicants legally established in any of the following countries (hereafter collectively identified as the “Eligible Countries”) are eligible for funding:

- The Member States (MS) of the European Union (EU), including their outermost regions.
 - In the case of Hungary, although it is an MS of the EU, according to Council Implementing Decision 2022/2506, no legal commitments should be entered into with any public interest trust established based on the Hungarian Law IX of 2021 or with any entity maintained by said public interest trust.
- Horizon Europe associated countries: according to the updated [list published by the EC](#) on December 2024.

4.2 Eligible entities

The European eligible entities for SPADE Open Call #2 should be legally identified under one of the following categories of organisations:

Universities and research centres: academic and research institutions. It's important to note that within a department, multiple research groups exist, and while different groups from the same department can apply, it's crucial that individuals are not concurrently members of multiple research groups to ensure equitable allocation of resources and dedication to their respective research pursuits.

- **NGOs and foundations:** non-profit organizations and foundations with experience in drone applications development.
- **SMEs and startups:** small and medium-sized enterprises and startups that focus on developing innovative solutions related to SPADE case studies.

Only SMEs are eligible in the case of companies.

An enterprise qualifies as an SME if it complies with the [European Commission Recommendation 2003/361/EC16](#) and the SME User Guide. In summary, an SME must meet the following criteria:

Headcount: Fewer than 250 Annual Work Units (AWU).

Financial Criteria:

- Annual turnover of \leq €50 million, OR
- Annual balance sheet total of \leq €43 million.

Natural persons, mid-caps, large industries, or corporations are **not** eligible under this call.

4.3 Open-source requirement

Spade focuses on delivering a digital environment of interoperable services through available drone platforms able to reduce the risks of the use of drones and other remotely piloted aircrafts. SPADE digital environment addresses risk-based modelling, the integration of data and information across different platforms, establishment of an open



marketplace, large-scale demonstration, multiplication of novel applications, the leverage of infrastructure and inclusion of public services.

Therefore, all applications must comply with the open source criteria as established in Technical Annex (Annex 1).

5. Proposal submission process

The submission will be done through the official online submission [SPLORO platform](#), which is directly linked to the [SPADE website](#). Only applications received through the online submission platform will be considered eligible.

We will provide applicants with a template of the application form (see [Annex 2](#)) to let them prepare the application offline before introducing the information in the form available at the [SPLORO platform](#). **Sending this form template in any other format and via e-mail or any other means will automatically disqualify the submission.**

The call deadline is final. No exceptions of any kind will be made, regardless of any personal circumstance that may have affected you on the day of the deadline. The SPADE team and the Helpdesk will not re-open or amend your application, nor consider any extra information or documentation sent to it after the deadline.

If an applicant discovers an error in a submitted application or aims to improve the application, the applicant may submit a new version provided the call deadline has not passed. To facilitate this step, the applicant must get in touch with the Helpdesk requesting to reopen the application. Applicants will be able to modify all answers of the application form as many times as needed until the deadline. Please be aware that once open, the applicants should submit the completed form again before the set deadline or it will not be evaluated. Once resubmitted, only the last version received before the call deadline will be considered for evaluation. Failure to resubmit will result in the proposal not being evaluated.

Resubmission requests will be answered up to two days before the call deadline (subject to limitations described below). It is imperative that you title your email's subject with the words "REOPENING OF SUBMITTED APPLICATION" so that our team can quickly see it and action it. The Helpdesk cannot guarantee a timely response during the last two days of the open call. Consider this when writing your proposals. Failure to follow the above instructions would not be grounds for an extension or re-evaluation of a proposal.

5.1 Application preparation

For the successful submission, applicants are strongly advised to follow these steps:

- Check the guidelines for applicants to determine if your organisation is eligible for the project.
- Applicants are required to apply online and answer all mandatory questions (with no exception) at: [SPADE_OC2_Applicants](#). Moreover, applicants must submit all the requested documents established in the call. The lack of any of the documents will negatively affect the eligibility of the applicant for the evaluation process. In addition, note that certain documents - which will be required for each applicant selected for the project and signing a sub-grantee agreement - may take time to acquire. It is highly advisable that you read the *Section: Sub-grant agreement preparation* and take into consideration the time needed to obtain these documents.
- Be concrete and concise. Open questions have words limitations.
- Please examine all the open call documents and attend the various online events promoted by the SPADE project to be prepared. Please, mark your calendars for our upcoming InfoDay and Technical Webinars:
 - **Info Day 1.** [26th March 2025//10:00 CEST*]. General Presentation, Open Source Criteria, and Open Call #2 Presentation.
 - **Info Day 2.** [10th April 2025//09:00 CEST*]. UCU (CH1 and CH2) & CStudy2: Forestry case study.
 - **Info Day 3.** [10th April 2025//10:00 CEST*]. CStudy 3: Livestock Case Study Integration.



- **Info Day 4.** [11th April 2025//11:00 CEST*]. UCU (CH3) & CStudy1: Open-field case study integration.

*Please note that the platform's time depends on the user's configured time zone and may or may not coincide with the correct time (this depends on the user, not the platform).

The webinars will be recorded and made available on the [SPADE website](#). Additionally, the applicant will have access to a FAQs document that will be updated weekly on the website. This update will be based on the questions received through the helpdesk and during the webinars.

- Only the submission within the Open Call duration will be accepted. There will not be any deadline extensions unless there is a Force Majeure situation (i.e., a major problem with the platform caused by the SPADE consortium and not by the applicants, making the system unavailable for a long period). - It is strongly advised not to wait until the last day.

5.2 Helpdesk and applicant's support

SPADE offers a dedicated support channel available for applicants at contact@spade-horizon.eu. Requests will receive a response within 72 hours of their submission. While all possible effort will be made to respond in a timely manner, the teams should plan their submissions, accordingly, allowing enough time before the deadline (i.e., at least 72 hours prior) if they expect an answer. Lack of receipt of an answer to an enquiry shall not constitute grounds for extension or re-evaluation of a submission. Requests or inquiries about the submission system or the call itself, received AFTER two days before the closure time of the call will neither be considered nor answered.

At the event that you encounter technical issues, please contact the Helpdesk clearly explaining what you are experiencing, including any error messages or unexpected behaviour. Specify the steps leading up to the problem, so that we can replicate it. Include a timestamp screenshot of your entire screen or the specific part where the issue is visible. Ensure that the screenshot includes the system clock or another form of timestamp. If applicable, provide any other relevant details such as the device, operating system, and browser you are using.

Even if you have a timestamped screenshot showing the error taking place beforehand, if the message with the screenshot does NOT reach the Helpdesk before the deadline, it will not be considered nor investigated. The time log of when the initial report reaches the Helpdesk email is the only factor that will be considered. If an applicant provides a screenshot showing that, on their end, an email was sent before the deadline, but this time does not match with the time log on the end of Helpdesk, it is always the Helpdesk's time log that will be considered.

Do not wait until the last moment to report technical issues to our Helpdesk. We recommend that you attempt to submit your work at least 48 hours before the official deadline to avoid any unforeseen problems.

Any communication stating technical issues received after the call deadline will not be considered nor considered.

6. Proposal Evaluation and Selection Process

In this section, all the details related to the evaluation and selection process for the proposals submitted to the SPADE Open Call#2 are described.

6.1 Application reception

Submissions will be done ONLY via the SPLORO platform, and it will be the unique entry point for all application submissions. Applications submitted by any other means will not be considered nor evaluated. Only the documentation included in the submission will be considered by evaluators. A full list of applicants will be drafted



containing their basic information for statistical purposes and clarity (which will be also shared with the EC for transparency). **The application reception will close on 26.05.2025, 17:00 (CET)*.** There will not be any deadline extensions unless there is a Force Majeure situation caused by the SPADE consortium and not by the applicants, which renders the system unavailable.

*The deadline for submission is as stated in this Guidelines document. Please note that the platform for submission's time depends on the user's configured time zone and may or may not coincide with the correct time (this depends on the user, not the platform for submission). Any discrepancies in system time will not be grounds for deadline extension.

6.2 Evaluation process

The evaluation process consists of the following steps:

1. Eligibility check
2. Alignment verification
3. External evaluation
4. Normalisation of results
5. Legal validation and sub-grantee agreement signature

The process to be followed during the selection of the proposals is shown in the following figure.

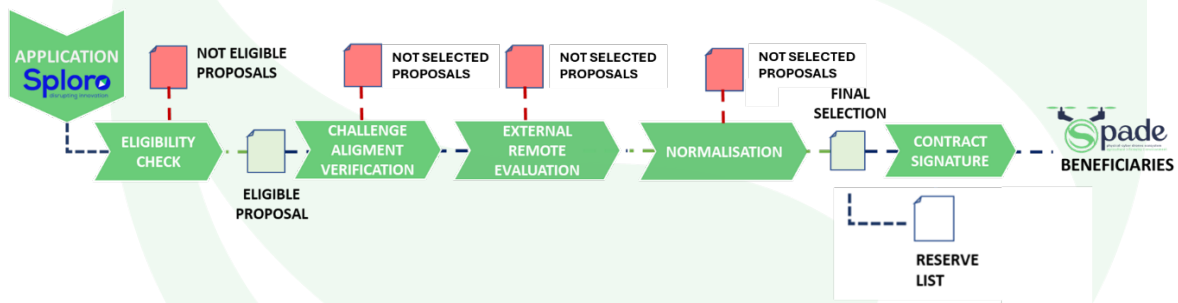


Figure 3. Evaluation process.

The evaluation process will be performed as follows:

6.2.1 Eligibility criteria

An automatic filtering to discard non-eligible proposals will follow the shortlist below.

Eligibility criteria check will verify:

- a) All the required fields are properly completed on the SPLORO platform, and all fields and documents are completed in English.
- b) The proposal has been submitted only by one partner (**no consortium allowed**).

- c) The existence of a legal entity.
- d) The legal entity is a university, research and technological centre, NGO, foundation or a SME
- e) The legal entity is registered in an EU Member State or a Horizon Europe associated country as indicated in the List of Participating Countries in Horizon Europe.
- f) Participation per entity:
 - 1. An entity can send a maximum of two proposals (one per challenge).
 - 2. In the case of larger organisations like **Universities, Research or Technological centres** a maximum of two proposals (one per challenge) per research group is allowed. Sharing personnel between different groups for multi-proposal submission will not be allowed.
- g) The uniqueness of the proposal (proposals that have already been funded in any other project will not be financed to avoid duplicate funding).
- h) The applicant is not currently working for any of the SPADE beneficiaries
- i) To comply with the **open-source requirements** as described in the technical annex.

Applications marked as non-eligible will get a rejection letter including the reasons (a to h) for being declared as non-eligible at the moment of communication of results. No further feedback on the process will be given.

6.2.2 Challenge alignment verification

Eligible proposals will advance to the Challenge Alignment Verification, conducted by the SPADE Challenge Leader, to ensure alignment with the project's core challenges and objectives. This verification will result in a straightforward **Yes/No** decision, accompanied by a comment. Once the review is completed, rejected applicants will receive a brief explanation at the time of result communication, ensuring transparency and a clear understanding of the evaluation process.

6.2.3 External remote evaluation

Applications that successfully pass the eligibility check and alignment verification will move to the remote evaluation stage. In this phase, two external evaluators with expertise in technology and business development will review each proposal, assigning scores based on 4 different evaluation criteria (**Team, Technical Excellence, Implementation, and Impact**).

1) Team:

Applicants must provide details about:

- Their management and leadership qualities.
- Their ability to translate a concept from ideas to practical application.
- Their technical capacity and understanding of the SPADE concepts.
- The team should be adequately resourced, fully dedicated to the project, and possess a strong background and skill set in drones. We require at least two team members working full-time (or one full-time member and several part-time members) to contribute to the development of the experiment.

2) Technical Excellence:



Proposals must clearly outline what will be done and how, demonstrating improvements on the SPADE architecture and a thorough understanding of the open architectures provided by the consortium. Excellence will be evaluated based on the following criteria:

- Clarity and pertinence of the objectives.
- Innovation, quality, and overall excellence of the project.
- Appropriateness of the solution in addressing the selected challenge.
- Clear identification of technological improvements over the current state of the art and their technical feasibility.

3) Implementation:

Applicants must explain how they plan to execute the experiment within the specified timeframe, ensuring alignment with SPADE's schedule.

- Provide a clear and detailed plan of proposed activities, ensuring they align with project objectives and are achievable within realistic timeframes.
- Highlight the suitability of human and technological resources, emphasizing the team's commitment and capability to deliver the project.
- Demonstrate a practical understanding of the project's scope and complexity, ensuring progress aligns with the overall objectives of SPADE.
- Take into account all deliverables established by case study leaders and contribute to additional deliverables deemed essential for successful project implementation.

4) Impact:

Proposals must demonstrate the impact on SPADE's progress and its contribution to the project's overarching objectives. Impact will be evaluated based on the following criteria:

- Clarity and specificity of the expected benefits from participation in SPADE.
- Plans for integration within the SPADE platform.
- Ideas regarding exploitation of results.
- Explanation of how mutual and sustainable benefits will be ensured.
- Assessment of the relevance and scope of the expected environmental impact.
- Relevance and potential for the project's economic impact.
- Contribution of the project to desired social improvements or transformations.
- Effectiveness of the proposed experiments in exploiting and disseminating project results and communicating the project.

The selected external evaluators will be independent of the organisations involved in the consortium and of any third party applying to the call. They will sign a declaration of confidentiality concerning the contents of the proposals they read. The form which they use in the evaluation carries a declaration of freedom from conflict of interest which they agree to by signing them. All evaluators will receive the evaluation guidelines, templates, and will be duly informed about the timing for an agile process and conflict of interest issues.



The external evaluators will score each award criterion on a scale from 0 to 5:

Table 1. Criteria Score.

SCORE	DEFINITION
0	Proposal fails to address the criterion or cannot be assessed due to missing or incomplete information.
1	Poor – criterion is inadequately addressed or there are serious inherent weaknesses.
2	Fair – proposal broadly addresses the criterion, but there are significant weaknesses
3	Good – proposal addresses the criterion well, but a number of shortcomings are present.
4	Very good- proposal addresses the criterion very well, but a small number of shortcomings are present.
5	The proposal successfully addresses all relevant aspects of the criterion. Any shortcomings are minor.

The total score will be calculated as the sum of the score of the 4 different criteria with a maximum of 20 points. The **threshold for each criterion will be two (2) points, while the overall score threshold will be ten (10)**. That means if a proposal receives less than 2 in one criterion or less than 10 overall score, will not be recommended for funding by the independent evaluators and will be automatically rejected.

6.2.4 Score normalisation

The two evaluators will score the proposal differently without knowing the evaluation of their colleague, thus avoiding one evaluator conditioning the other. Therefore, the same evaluation may receive very different scores. The normalization step guarantees a more balanced distribution of scores and reduces the possibility of biases and distortions.

The normalisation process is performed as follows:

- **The External Evaluators Average (EEA) and Overall Average Score (OAS)** of all proposals are calculated
- Each External Evaluator Average is compared to the Overall Average Score using a simple division (EEA / OAS). As a result, the percentage each evaluator represents of the OAS is estimated. This has a double meaning:
 - Evaluators under 100% have a negative pattern against the average. Their scores are then increased.
 - Evaluators above 100% have a positive pattern against the average. Their scores are then decreased.



- **Correction factor calculation:** Based on this formula $1 + (1 - (EEA/OAS))$. This factor is unique for each evaluator.
- The Correction Factor is applied to each criterion per evaluator. **Excellence x Correction Factor | Implementation x Correction factor | Impact x Correction factor.**
- Then the final score of each criterion is calculated as the average of each corrected score of the two evaluators on each proposal. (It may be the case that correction brings scores over a 5 in any criteria. In those cases, the score is capped at 5).
- The corrected scores are added, and the total score is calculated.

A virtual consensus meeting will be held to review and harmonise evaluations between the two evaluators. The evaluators will reassess their scores, and a final score will be calculated as the mathematical average of their revised scores, without any additional normalisation.

Finally, the shortlist is built from highest to lowest total score. Using this method, a more balanced distribution of scores would be guaranteed, and the possibility of biases and distortions would be reduced. At the end of the evaluation process, all proposals will be ranked based on their final score and results will be communicated to the applicants around 04.07.2025.

6.2.5 Final Selection

At the end of the evaluation process all proposals will be ranked based on their final score from highest to lowest.

In the case of a tie the following criteria will be applied in order:

- ***Rule 1: Gender Representation.** Applications that include a higher number of women candidates in the submitted CVs will be prioritised to promote gender balance in the selection process.*
- ***Rule 2: Geographical Diversity.** Applications from less represented countries amongst the submitted applications will be given preference to enhance inclusivity and broaden the geographic scope of expertise.*
- ***Rule 3: Submission Timing.** Applications will be processed on a first-come, first-served basis, meaning those who submit their applications earlier will be prioritised in the selection queue.*

The SPADE consortium will then formally approve a list of proposals within the limits of the available funding. Best proposals (one proposal per challenge) will be invited to sign the sub-grantee agreement. The list will be communicated to the European Research Executive Agency for approval.

For **Open Call #2 (OC#2)**, the total budget available is **525,000 EUR**. In challenges where the available budget is not fully utilised the remaining funds may be reallocated to the highest-scoring proposals on the waiting list of other challenges based on the existing needs of SPADE project.

If an entity or a larger organisation achieves the highest score in two challenges, the SPADE Consortium will decide which one they will be selected for, based on the needs of the SPADE project and the background of the personnel involved.

At this stage, all applicants will be informed about the outcomes of the evaluation process: non-eligible, below the threshold, above the threshold but not selected, pre-selected, and placed on the waiting list. For each challenge, one applicant will be selected, and two will be placed on the waiting list. If a challenge does not receive any applications that meet the evaluation criteria, its budget may be transferred to another challenge, allowing for the selection of an additional beneficiary from the waiting list.



Statistical data on the proposals received will be published, including information on the applicants' country, gender, and the number of proposals submitted per challenge.

6.2.6 Appealing procedure

The SPADE consortium has foreseen the possibility for applicants to appeal the decision of the consortium of not selecting their proposal. If, after the evaluation process, the applicant considers that there has been a factual error in the way the proposal has been evaluated that may affect the final decision on whether to fund it or not; or if the applicant believes the results of the eligibility checks are incorrect and do not adhere to the Open Call rules, resulting in harm to their interests, the following appeal procedure is available:

- If clear evidence of a deficiency that could influence the ultimate funding decision exists, it is possible that all or part of the proposal will be subject to re-evaluation.
- Complaints must be submitted within **five (calendar) days** from the date of receiving the evaluation results via de email. contact@spade-horizon.eu.
- The SPADE Team will investigate complaints with the aim of reaching a decision to issue a formal notice or to close the case within no more than **twenty days from the date of receiving** the complaint, provided that all required information has been submitted by the complainant. If this timeline cannot be met, the complainant will be informed by email of the delay and given a new decision date.
- In instances where re-evaluation is deemed necessary, the outcome will directly replace the initial score without undergoing normalization or any other adjustment process. This clause is specifically designed to expedite the appeal resolution and prevent delays in the project's timeline

To maintain the efficiency of the process, each proposal is allowed a single appeal. The decision reached at the end of the appeal process is final, concluding any further discussion regarding the proposal's evaluation. No exceptions to any of the rules explained in these guidelines can or will be made by the SPADE consortium.

The reviewers' opinions are subjective and may differ from those of the applicants. Our process ensures that scores are normalised to minimise personal bias from external experts and are averaged to achieve a fair consensus on the final score.

Applicants may have differing views on the outcome and the evaluators' assessments. However, the SPADE Open Call team will not comment on the evaluators' opinions or scores unless a factual error is identified

6.2.7 Validation of the legal entity

Before validating the final list of accepted applicants, a thorough validation of the legal entities is performed. This validation includes the submission of various documents to ensure compliance with the SPADE project's requirements.

A legal entity that does not provide the requested data and documents in due time will not be awarded.

The requested elements for validation that will be requested are:

- To validate the identity and the power of attorney of the person who will sign the sub-grantee, SPADE will ask for the ID number and an ID scanned copy of the signatory. On the scanned copy, personal information included on the ID card could be covered if not relevant for the contract signature such as religion, ethnicity and/or personal address. The picture, expiry date, name, surname, number of the document and nationality should be visible without exception. SPADE will also ask for the power of attorney of the person who will sign the Sub-grantee agreement.



For entities that are **already validated by the European Commission's Funding and Tenders Portal** that count with a registered and validated PIC Number, the PIC Number and a screenshot of the Funding and Tenders portal in which it's evidenced the type of organisation which has been selected as a beneficiary (university, NGO, foundation, SME...) is required.

For those entities **without a validated PIC number** OR without a validated status (like self-declared SMEs), the following documents are requested:

- Legal entity form. The Legal Entity form for private companies, and public law bodies necessary for the awarding of EU funding. Company Register, Official Journal and so forth, showing the name of the organisation, the legal address and registration number and
- VAT Number registration (if applicable), a copy of a document proving VAT registration (in case the VAT number does not show on the registration extract or its equivalent).

SMEs will also be requested for a:

- SME declaration (see [Annex 4](#)): form based on the standard templates by the EC in which the consortium can verify the ownership structure and financial figures to verify the size of the company.
- Balance accounts and P&L for the last two closed years.
- In companies with linked or associated entities, additional information (accounts for mother companies, group trees, etc.) could be requested.
- A legal entity that does not provide the requested data and documents in due time will not be included in SPADE project.

At the same time, the Financial Identification Form and bank account validation documents will be requested:

- Financial Identification Form (FIF). Form identifying the account to which the funds will be transferred signed by the legal representative of the organisation
- Bank statement showing the ownership of the account.

6.2.8 Sub-grantee agreement preparation

After the validation of the Legal Entity, a written Sub-grantee agreement will be signed with successful applicants and SPLORO (open call manager).

All the legal issues are accurately covered by the planned contracts with the sub-granted beneficiaries. The sub-grantee agreement will foresee, among other things, the special clauses derived from Horizon Europe in cascading granting, the payment schedule, and conditions (milestones), general legal text issues of rights and obligations by the SPADE consortium and each sub-grantee, including IPR. It will also have a set of annexes such as the description of the project, the Financial Identification Form and any other document required by SPADE consortium to assure the correct execution of the sub-granted projects.

The sub-granted projects will also define deliverables and technical milestones linked to a set of KPIs, to which the project will associate the payment at the end of each phase. The case studies leaders would support the assessment of the milestones. The objective of the contract preparation is fulfilling the legal requirements between the SPADE consortium and every beneficiary of the call.

7. Financial support

The overall budget allocated for the OC#2 is 525,000 EUR. The grant is disbursed throughout the SPADE project using a “flat rate” approach. In this approach, funding is progressively distributed based on the achievement of specific outcomes and milestones, rather than relying solely on administrative justifications related to time and/or expenses. It’s worth noting that the maximum amount per beneficiary is 60,000 EUR in 8 challenges and 45,000 EUR in 1 challenge as detailed in section 3.

7.1 Subcontracting

Regarding “subcontracting,” it is important to note that within the context of SPADE, subcontracting is strictly prohibited for core/essential tasks. This signifies that the primary responsibilities associated with the project must be undertaken and carried out by the team members described in the proposal. It is essential to maintain a clear understanding that the core tasks should not be delegated to external entities or subcontractors. The team should possess the necessary expertise and capacity to fulfil these crucial obligations to ensure the successful execution of the project.

7.2 Indicative distributions of the funds.

The selected proposals must, in collaboration with a consortium representative (Case Study leader), develop an execution plan outlining the metrics to be achieved at both the third month and the conclusion of the experiment. This action plan will be considered a legally binding document to determine consortium payments.

During the evaluation process, the selected projects will conduct Interim and a final report, presenting the activities carried out and the level of compliance with the metrics outlined in the execution plan. Based on this achievement level, funds will be disbursed in tranches of 30,000 EUR-22,500 EUR in months 4 and 7 (final payment) (Table 2).

The final evaluation will entail a comprehensive review of the experiment, with a final calculation on KPI compliance, releasing funds up to the limit of 60,000 EUR per team.

Table 2. Payment’s milestones

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7
OUTPUT	KPIs and deliverables definition		Interim Report + Deliverables			Final Report + Deliverables	
Payments (EUR)				30,000 / 22,500			30,000 / 22,500

If, during the two project review stages, the established goals, KPIs, milestones, and deliverables are not achieved, payments will be made based on the percentage of accomplishment.

7.3 Origin of funds

Once an applicant has been selected for funding, they will be required to sign a dedicated Sub-Grantee Funding Agreement with the SPADE consortium. It is important to note that the funds attached to the Sub-Grantee Funding Agreement come directly from the funds of the Horizon Europe Project SPADE, which has been funded by the European Commission. Therefore, the funds remain the property of the EU until the payment of the balance, which is managed by the project partners in SPADE via European Commission Horizon Europe Grant Agreement Number 101060778.

The Sub-Grantee Funding Agreement represents a significant commitment from both the SPADE project and the sub-grantees who will receive funding. The relationship between sub-grantees and the European Commission through the SPADE project carries a set of obligations for the sub-grantees with the European Commission. These obligations will be outlined in the Sub-Grantee Agreement, which the selected applicants will need to review and agree to. It is the responsibility of the sub-grantees to ensure that they fulfil these obligations, and the SPADE consortium partners will provide guidance and support as needed.

All selected applicants should carefully review the terms of the agreement and ensure that they are able to meet their obligations to receive the funding and successfully carry out their project.

7.4 Allocation of funds per entity.

To ensure equitable distribution of resources, the maximum funding that can be granted to a single organization across all SPADE project calls is capped at **60,000 EUR**.



8. Rules and Conditions

8.1 Language

English is the only official language for the SPADE project. Submissions done in any other language will not be eligible and will not be evaluated. This means that all the communication and materials will be in English, and all deliverables will only be accepted if in English.

8.2 Documents format

Unless otherwise stated in specific questions of the application form (see [Annex 2](#)) any document requested in any of the phases must be submitted electronically in **PDF format without restrictions for printing**.

8.3 Absence of conflict of interest

Applicants must not have any actual or potential conflicts of interest during the SPADE selection process or the entire project duration. Any situations that could potentially influence the impartiality of the individuals taking part in the selection process, or during the project implementation, are considered conflicts of interest. These can include financial interests, personal relationships, or any other factors that could affect the applicant's ability to remain impartial. All cases of conflict of interest will be assessed on a case-by-case basis by the relevant SPADE selection committee and consortium partners. If an applicant is found to have a conflict of interest, this could result in the application being disqualified.

It is important to note that SPADE consortium partners, their affiliated entities, employees, and permanent co-operators are not allowed to submit a proposal and therefore to receive any financial support through the open calls, as this would violate the European Commission's regulations.

8.4 Ethical Issues

SPADE strictly adheres to the fundamental ethical principles outlined in the “European Code of Conduct for Research Integrity.” To ensure compliance, all applicants are required to acknowledge and accept our privacy policy and declaration of honour (ethics) during the submission process. This acknowledgment confirms that, by submitting the form, they accept the terms described in the provided text. No additional documents need to be uploaded; applicants are solely required to read and agree to the terms outlined when submitting the form.

During the evaluation process, **the SPADE consortium may verify whether the self-assessment declaration aligns with the contents of the application.** In cases where clarification is needed, the consortium reserves the right to contact the beneficiaries. If an applicant indicates that their application may have ethical issues, an ethics review will be conducted. Applications that fail to adequately address ethical concerns or privacy aspects will be rejected.

All applicants must thoroughly review and assess their applications for any potential ethical issues before submission. Failure to comply with the ethical guidelines outlined in the “European Code of Conduct for Research Integrity” could lead to disqualification of the application. Therefore, it is of utmost importance that all applicants take the necessary steps to ensure that their proposals meet the highest ethical standards.

8.4.1 Ethics self-assessment

It is imperative that all beneficiaries comply with the ethical guidelines followed by the SPADE consortium (see [Annex 5](#)). These guidelines are designed to ensure that operations are conducted with integrity, transparency, and respect



for all stakeholders involved. By adhering to these ethical standards, we aim to promote fairness, accountability, and responsible conduct throughout the bidding process.

8.5 Data Protection and confidentiality

During implementation of the sub-project and for five years after the end of the sub-project, the parties must keep confidential any data, documents or other material (in any form) that is identified as confidential at sub-grantee signing time ('confidential information').

In SPADE we are committed to protecting your privacy and secure your personal data. This article explains how we handle your personal data in accordance with the applicable national and European data protection legislation, including Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons regarding the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (GDPR).

As we determine the purpose and means of processing your personal data in the context of submission of proposal for this Open Call, which is part of the SPADE activities, Sploro is the Data Controller with regard to the processing of your personal data.

SPLOROTECH SL, address: PARQUE TOMÁS CABALLERO 2, Sexto, Oficina 1,

Despacho 6.10, Pamplona, Spain (hereinafter Sploro)

E-mail: lopd@sploro.eu

In the context of conducting this Open Call, which is part of the project SPADE, we collect your personal data necessary for evaluating your proposal. These data may include but is not limited to:

- Name, contact information, and professional details (provided via form, CV standalone files or any other type of data)
- information included in your application forms, supporting documents, or other materials.

This data will be used for purposes such as evaluating submissions, managing participation in the programme, and complying with our contractual obligations under grant agreements the programme you are applying are part of.

Your personal data may be shared with third parties which may, include, but are not limited to:

- Granting Authorities: REA.
- Consortium Partners: The information provided may also be shared with the partners in the consortium. These partners are contractually obligated to handle your data in compliance with applicable with national and European data protection legislation, including GDPR standards, ensuring the confidentiality and security of your personal data. More about the project consortium members you can find at the project website.
- Subcontractors or evaluators involved in assessing applications or implementing actions.
- Monitoring and oversight bodies, including internal audits, the European Court of Auditors, and the European Anti-Fraud Office (OLAF), as required under Union or national laws.

Such sharing will be conducted in compliance with GDPR, the grant agreements, and other relevant regulations. In particular:

For EC co-funded programme, personal data included in applications will be shared with the EC or its agencies, as required by Articles 15, 19, and 25 of Horizon Europe Grant Agreement.



REA may process this data as data controllers to monitor compliance, ensure proper implementation, and verify eligibility.

Accuracy and Completeness of Data

All data provided must be accurate, precise, and complete, as required by Article 19.1 of the Horizon Europe Grant Agreement. Failure to provide such data may result in the inability to process your application or other actions necessary for programme participation.

Security Measures

Sploro implements appropriate technical and organizational measures to ensure the security of your personal data.

All data processing activities are carried out in a strictly confidential manner, and secured according to the state of the art, and industry best standards using anonymization techniques where possible.

The processing of your personal data is carried out strictly in accordance with the principles of data protection as laid down in the GDPR. All data processing activities are carried out lawfully by ensuring that the legal ground for the processing is given.

As the processing of your personal data is based on your consent, you have the right to withdraw your consent at any time by contacting us at lopd@sploro.eu. Please note, however, that once you have withdrawn your consent, we will no longer be able to process your data and will not be able to continue with the evaluation of your proposal.

We will only process your data for the purposes explained in this article and will only retain data for as long as necessary to fulfil the purposes explained. After that, your data will be securely deleted or anonymized. We emphasize that we take appropriate technical and organizational measures to protect your data from unauthorized access, disclosure or misuse, in accordance with the requirements of relevant regulations.

Under the GDPR, you have the following rights concerning your personal data:

- Right of Access
- Right to Rectification
- Right to Erasure
- Right to Restrict Processing
- Right to Data Portability
- Right to Object

To exercise data protection rights or have any questions regarding your personal data, please contact us at lopd@sploro.eu.



9. Beneficiaries' Responsibilities

The selected organizations are indirectly beneficiaries of European Commission funding. As such, they are responsible for the proper use of the funding and ensure that the recipients comply with obligations under Horizon specific requirements. The obligations that are applicable to the recipients include:

9.1 Conflict of interest

Beneficiaries must take all measures to prevent any situation where the impartial and objective implementation of the sub-project is compromised for reasons involving economic interest, political or national affinity, family or emotional ties or any other shared interest ('conflict of interests'). They must formally notify to the SPADE coordinator without delay any situation constituting or likely to lead to a conflict of interest and immediately take all the necessary steps to rectify this situation. The SPADE coordinator may verify that the measures taken are appropriate and may require additional measures to be taken by a specified deadline. If the sub-contracted consortium member breaches any of its obligations, the sub-contract may be automatically terminated. Moreover, costs may be rejected.

9.2 Data protection and confidentiality

During implementation of the sub-project and for four years after the end of the sub-project, the parties must keep confidential any data, documents or other material (in any form) that is identified as confidential at sub-contract signing time ('confidential information').

9.3 Promotion of the action and EU Funding visibility.

The beneficiary must promote their participation in the SPADE. They will provide targeted information to multiple audiences (including the media and the public) in a strategic and effective manner and to highlight the financial support of the EC. The SPADE Communication Team will guide, provide materials and support these communication activities. Unless the European Commission or the SPADE coordinator requests, or agrees otherwise or unless it is impossible, any communication activity related to the action (including in electronic form, via social media, etc.), any publicity, including at a conference or seminar or any type of information or promotional material (brochure, leaflet, poster, presentation etc.), and any infrastructure, equipment and major results funded by the grant must:

- display the EU emblem;
- display the SPADE logo.

When displayed in association with a logo, the European emblem should be given appropriate prominence. This obligation to use the European emblem in respect of projects to which the EC contributes implies no right of exclusive use. It is subject to general third-party use restrictions which do not permit the appropriation of the emblem, or of any similar trademark or logo, whether by registration or by any other means. Under these conditions, the Beneficiary is exempted from the obligation to obtain prior permission from the EC to use the emblem. Further detailed information on the EU emblem can be found on the Europa web page. Any publicity made by the beneficiary in respect of the project, in whatever form and on or by whatever medium, must specify that it reflects only the author's views and that the EC or SPADE project is not liable for any use that may be made of the information contained therein. The EC and the SPADE consortium shall be authorized to publish, in whatever form and on or by whatever medium, the following information:

- the name of the beneficiary;
- contact address of the beneficiary;
- the general purpose of the project;



- the amount of the financial contribution foreseen for the project; after the final payment, and the amount of the financial contribution actually received;
- the geographic location of the activities carried out;
- the list of dissemination activities relating to the foreground;
- the details/references and the abstracts of scientific publications relating to the foreground and, if funded within the sub-project, the published version or the final manuscript accepted for publication;
- the publishable reports submitted to the SPADE consortium;
- any picture or any audio-visual or web material provided to the EC and SPADE in the framework of the project.

The beneficiary shall ensure that all necessary authorisations for such publication have been obtained and that the publication of the information by the EC and SPADE does not infringe any rights of third parties. Upon a duly substantiated request by the beneficiary, SPADE, if such permission is provided by the EC, may agree to forego such publicity if disclosure of the information indicated above would risk compromising the beneficiary's security, academic or commercial interests.

9.4 Financial audits and control

The European Commission (EC) will monitor compliance with the financial support conditions outlined in Annex 1 of the SPADE Grant Agreement by beneficiaries and third parties. The EC may conduct financial audits, which may be conducted by external auditors or by EC services, including the European Anti-Fraud Office (OLAF). Beneficiaries must make all detailed information and data available to the EC or any authorized representative for audit purposes. The beneficiary must keep all sub-project deliverables and documents for up to five years from the end of the project.

9.5 Internal communication

Every chosen project participant is required to designate a primary contact who will serve as the coordinator throughout the project's execution:

- Provide any notice in writing to the SPADE coordinator.
- Notify immediately of any change of persons or contact details to the SPADE coordinator.

9.6 External communication and open data

As part of the external communication and open data practices, each supported organization will be prominently featured on SPADE's public channels, such as social networks or the website. The financial assistance provided by the SPADE consortium to each beneficiary will be transparently disclosed through a dataset published in an open and free repository, such as Zenodo. It is important to note that only public information will be shared, aligning with the principles of transparency and openness.

Additionally, the publication of solutions developed by beneficiaries is permitted, provided that they have adopted best practices in open source development (open development, open collaboration, documentation including a getting started, continuous testing, continuous integration, contribute to the SPADE community). Since selected projects are encouraged to initiate their solutions on the SPADE Research Labs infrastructure from the outset, it is



emphasized that this infrastructure is backed by the Eclipse Foundation and hosted on its GitLab platform. This early collaboration ensures that solutions can fully benefit from the advantages and services offered by this platform.

