OpenSwarm

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Deliverable 7.2 – Running List of dissemination activities together with reports from each event

Work Package 7 (WP7) – Communication, Dissemination, Exploitation

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Acronyms and Abbreviations

EC	European Commission
GA	Grant Agreement
KPI's	Key Performance Indicators
OA	Open Access

Executive Summary

This document provides an overview of the OpenSwarm project's beneficiaries' strategy and concrete actions regarding the dissemination of project results. The aim of deliverable D7.2 is to outline the comprehensive plan for sharing the project's findings and engaging with relevant stakeholders.

The dissemination strategy proposed outlines the approach adopted by OpenSwarm beneficiaries, highlighting the underlying reasons for disseminating the project's results. It explores the target audiences and stakeholders, identifies key messages and objectives, and specifies the dissemination channels and tools to be used. Building upon the dissemination strategy, the document then presents a detailed dissemination plan. This includes an overall timeline and milestones, allocation of responsibilities and resources, and mechanisms for monitoring and evaluating the dissemination activities. Afterwards, the deliverable delves into the various dissemination activities carried out by OpenSwarm, encompassing scientific publications, engagement at conferences, standardization efforts, protocol hackathons, open-source software initiatives, expert workshops, and various workshops and tutorials organized by OpenSwarm.

In summary, this is a first version of a deliverable that encapsulates OpenSwarm's robust strategy and concrete actions pertaining to the dissemination of project results. This document will be systematically maintained by the consortium with a running list of dissemination activities, which can be made available upon request. By employing a comprehensive approach and leveraging various dissemination channels and activities, OpenSwarm aims to maximize the impact and reach of its findings, facilitating knowledge exchange, collaboration, and long-term sustainability in the field of networking, orchestration, AI, and multi-robot systems.

1. Introduction

The OpenSwarm project is committed to effectively disseminating its findings and engaging with relevant stakeholders to maximize the impact and reach of its results. This document, Deliverable D7.2 – "Running List of Dissemination Activities together with Reports from Each Event", presents an in-depth overview of the beneficiaries' strategy and concrete actions pertaining to the dissemination of project outcomes.

This deliverable begins with a brief introduction in Section 1, setting the context for the document. It highlights the purpose and scope, providing an overview of the document's intended readership. Furthermore, it establishes the interrelation of this deliverable with other project deliverables, emphasizing its significance within the broader OpenSwarm framework.

Section 2 delves into the key components of the dissemination strategy. The strategy outlines the approach adopted by OpenSwarm beneficiaries, elucidating the underlying reasons and benefits of disseminating the project's results. It identifies the target audiences and stakeholders, delineates the key messages and objectives to be conveyed, and specifies the dissemination channels and tools that will be utilized.

Following the dissemination strategy, Section 2 presents a detailed dissemination plan. This plan encompasses an overall timeline and milestones, outlining the sequence of activities and events. It also allocates responsibilities and resources, ensuring efficient implementation of the dissemination efforts. Additionally, mechanisms for monitoring and evaluating the dissemination activities are defined, enabling the OpenSwarm consortium to measure the effectiveness of its initiatives and make adjustments as necessary.

To provide a comprehensive overview, Section 3 highlights the various dissemination activities carried out by the OpenSwarm consortium. These activities encompass a range of avenues, such as scientific publications, participation in conferences, engagement in standardization efforts, protocol hackathons, open-source software initiatives, expert workshops, and various workshops and tutorials organized by OpenSwarm.

1.1. Purpose & Scope of the Document

The purpose of this document is to provide a comprehensive overview of the OpenSwarm project's beneficiaries' strategy and concrete actions pertaining to the dissemination of project results. It serves as a guide for effectively sharing the findings of the project and engaging with relevant stakeholders to maximize their impact and reach.

The scope of this document encompasses the entire dissemination process, from the formulation of a dissemination strategy to the execution of various dissemination activities. It outlines the approach adopted by OpenSwarm beneficiaries, the target audiences and stakeholders involved, and the key messages and objectives to be conveyed.

Furthermore, this document details the specific dissemination channels and tools that utilized, as well as the timeline, milestones, responsibilities, and resources allocated for the dissemination efforts. It also includes mechanisms for monitoring and evaluating the dissemination activities to ensure their effectiveness and make any necessary adjustments.

By providing a comprehensive understanding of the purpose and scope of the document, OpenSwarm aims to facilitate effective knowledge exchange, collaboration, and long-term sustainability in the fields of networking, orchestration, AI, and multi-robot systems. The information presented here will guide OpenSwarm's stakeholders

in implementing successful dissemination strategies and actions to maximize the impact of the project's outcomes.

1.2. Intended Readership

This document is primarily intended for the European Commission (EC) Project Officer (PO) overseeing the OpenSwarm project and the consortium members involved in the project. The PO will gain valuable insights into OpenSwarm's dissemination strategy, activities, and the concrete actions taken to share project results. Consortium members will also benefit from this document as it provides a clear understanding of their roles and responsibilities in implementing the dissemination plan. Additionally, the document serves as a reference for stakeholders and collaborators interested in the OpenSwarm project, enabling them to gain a comprehensive overview of the project's dissemination efforts and engage effectively with the consortium.

1.3. Central Definitions

In these first months of the project, OpenSwarm partners agreed on a common terminology among the partners in the consortium, and set up a system for tracking communication, dissemination and exploitation activities implemented all along the project.

1.4. Terminology adopted

The various terms used in the context of this report are defined within the framework of the Horizon Europe program guide (Version 3.0 published on April 1, 2023). To complete

- **Results**: Results' means any tangible or intangible effect of the action, such as data, know-how or information, whatever its form or nature, whether or not it can

be protected, as well as any rights attached to it, including intellectual property rights.

- **Intellectual Property** (IP) includes:
  - Products of the mind
  - Products of research & experimentation
  - Products of creativity
  - Intellectual Property, like Physical Property can be a valuable asset.
  - Like physical property, intellectual property is an asset which can be traded (sold, bought, leased, used as collateral, or given away)

1.5. Associated Openswarm Deliverables

The Initial Dissemination Plan of the project is closely linked with all deliverables related with communication and exploitation, namely:

- D7.1. Visual identity defined, communication schedule, website running and first video posted;
- D7.2. Running list of dissemination activities together with reports from each event (this deliverable);
- D7.3a. Initial exploitation plan of the project;
- D7.3b. Exploitation plan of the project, including costs/benefit analysis of PoC and potential business model.

Dissemination, communication, and exploitation are interconnected components that play crucial roles in the success of the OpenSwarm project. Effective dissemination ensures the wide and targeted distribution of project outcomes, promoting visibility, collaboration, and adoption by relevant stakeholders. On the other hand, communication activities provide the means to convey project achievements, updates, and key messages to the intended audience, fostering engagement and knowledge sharing. Lastly, exploitation activities focus on leveraging the project's results and

intellectual property (IP) to create commercial value and facilitate the adoption of OpenSwarm technology.

The dissemination plan herein presented serves as a roadmap for executing targeted actions to maximize the reach and impact of OpenSwarm. It encompasses various activities, such as submitting Internet-Drafts to Internet Engineering Task Force (IETF) meetings, organizing workshops and hackathons, hosting tutorials and workshops at relevant conferences, and distributing educational OpenSwarm kits to high schools and universities. The dissemination plan is a living document that will be continuously refined and updated as the project progresses, ensuring its alignment with the evolving project objectives and outcomes.

Parallel to the dissemination plan, communication activities are adopted to effectively convey project-related information and engage with the wider community. This includes communication training to enhance effectiveness and address unconscious bias, establishing a visual identity for the project, creating a website and social media presence, and maintaining a regular stream of posts and videos. The communication plan is closely linked to the dissemination plan, as it provides the channels and tools necessary to amplify the impact of dissemination efforts, ensuring the visibility and accessibility of OpenSwarm's achievements to the target audience.

Both the dissemination plan and the communication activities are running documents that require continuous monitoring, evaluation, and adaptation throughout the project's duration. Regular reviews and all-hands meetings will provide opportunities to assess the progress and effectiveness of these activities, allowing for adjustments and refinements as needed. By synergistically combining dissemination and communication efforts, the OpenSwarm consortium aims to create a dynamic and engaging environment that maximizes the dissemination and exploitation potential of the project, ultimately driving the widespread adoption and impact of OpenSwarm technology.

2. Dissemination strategy

This section outlines the approach and plan adopted by the OpenSwarm beneficiaries to effectively share and promote the project's results. This strategic framework encompasses targeted activities and initiatives aimed at reaching key stakeholders, maximizing the impact of the project's findings, and fostering collaboration and knowledge exchange within the relevant domains. By implementing a comprehensive dissemination strategy, OpenSwarm aims to ensure the wide dissemination and utilization of its outcomes.

2.1. Approach

OpenSwarm adopts a proactive and multi-faceted approach to dissemination, recognizing the importance of engaging with diverse stakeholders and leveraging various channels for maximum impact. The approach encompasses a combination of targeted communication efforts, active participation in scientific communities, collaboration with industry partners, and the utilization of open-source platforms and standards.

2.1.1. Why to disseminate?

Dissemination plays a crucial role in the OpenSwarm project due to the disruptive and novel nature of the topics it covers, including networking, orchestration, AI, and multi-robot systems. The need for dissemination arises from several factors that highlight the significance of sharing project results with the wider scientific community, industry stakeholders, policymakers, and the general public.

Firstly, OpenSwarm aims to advance the state-of-the-art in these fields by developing innovative solutions, algorithms, and frameworks. Dissemination allows OpenSwarm to showcase its research outcomes, providing visibility and recognition for its groundbreaking contributions. By disseminating findings and knowledge, OpenSwarm

can foster collaborations, facilitate peer-review, and contribute to the overall progress and evolution of the scientific domain.

Secondly, OpenSwarm acknowledges the importance of addressing societal challenges and creating impact beyond academia. Dissemination enables OpenSwarm to communicate the potential benefits of its research to a broader audience, including industry partners, policymakers, and end-users. By sharing its results, OpenSwarm aims to inspire and catalyse the adoption of its solutions, driving innovation, economic growth, and societal transformation.

Furthermore, the dissemination of OpenSwarm's findings contributes to the overall sustainability and longevity of the project, providing a favourable ground towards successful exploitation. By actively engaging with stakeholders and disseminating results, OpenSwarm can attract funding opportunities, forge partnerships, and enhance the project's visibility and reputation. This, in turn, fosters the continued support and investment necessary for the project's sustainability and long-term impact.

In summary, the need for dissemination in OpenSwarm is underscored by the disruptive and novel nature of its research topics, the desire to advance the field, the aspiration to create societal impact, and the goal of ensuring project sustainability and successful future exploitation. By disseminating its findings, OpenSwarm aims to share knowledge, foster collaboration, inspire innovation, and drive the adoption of its solutions for the benefit of the scientific community, industry, and society at large.

2.1.2. Target Audiences and Stakeholders

In the context of the OpenSwarm project, a diverse range of target audiences and stakeholders are identified, encompassing various sectors and interest groups. Understanding and engaging with these different audiences is essential for effective dissemination and maximizing the impact of the project's results. The target audiences and stakeholders can be categorized into several main categories:

1. General Audience: This category includes individuals and organizations with a general interest in the fields of networking, orchestration, AI, and multi-robot systems. It comprises researchers, scientists, academics, students, and enthusiasts who seek to stay updated with the latest advancements and research outcomes. The general audience serves as a knowledge-sharing community and potential collaborators, fostering cross-disciplinary exchange and innovation. This category includes the general public as well, which is important for shaping the debate of the need for and acceptable use of technological solutions enabling collaboration between humans and autonomous systems.
2. Proof of Concept (PoC) Stakeholders: OpenSwarm involves multiple PoC deployments, each targeting specific domains. These PoC include industry, policymakers, government agencies and other end-users, which are vital stakeholders and target audiences who directly engage with OpenSwarm's solutions and contribute to their validation and refinement.
    a. PoC1:
        i. Renewable Energy Community Organizers: Stakeholders involved in managing and coordinating local renewable energy initiatives, such as community energy cooperatives and organizations promoting sustainable energy practices.
        ii. Energy Consumers and Producers: Individuals and businesses participating in the renewable energy community who are interested in optimizing energy consumption and production through swarm technology.
        iii. Distribution System Operators: responsible for building, maintaining, and operating the distribution network within its regulatory limits. All entities connected to the distribution network are its customers. To ensure operation, it evaluates, for example, power requests from existing or new network customers (e.g., prosumers) regarding possible grid violations and grants approval or rejects installation of a new system. In future, however, the DSO will be able to influence

the power demand of its customers actively to prevent overloading of components or violation of limits in times of high grid utilization. In times of low utilization, customers can then use higher power potential.

iv. Regulatory Bodies: set up the regulatory framework for current and future operation of the electrical distribution grid. For the proposed system a regulatory backing and standardization is strongly needed.

b. PoC2

i. Environmental Conservation Organizations: Stakeholders engaged in environmental preservation and conservation efforts, including NGOs, wildlife protection agencies, and forestry departments.

ii. Forest Workers and Researchers: Professionals involved in forestry management, environmental research, and the sustainable harvesting of wild food resources.

c. PoC3

i. Marine Protection Agencies: Stakeholders responsible for safeguarding marine ecosystems and enforcing regulations in protected marine environments.

ii. Environmental labels and educators: Stakeholders that influence professionals and users in the Boating Industry to promote environmental awareness, delivering for instance labels and awards on a voluntary basis (e.g. Blue Flag).

iii. Environmental Researchers and Marine Biologists: Scientists and experts studying marine life and ecosystems, focusing on the impact of motorboat activities.

iv. Public Authority in coastal marine & great lake areas: cities and regions pre-occupied with favoring touristic and leisure activities that are compatible with protecting the environment, in line with their Public mandate and in order to preserve the longevity of such activities.

v. Private managers of marinas and mooring areas and their representatives (e.g. ICOMIA Marinas Group): the Marina Industry strives to provide appropriate guidance, controls and policies to promote boating practices that are sustainable and safe for users and for the environment.

d. PoC4
   i. Manufacturing Companies: Industrial organizations interested in enhancing the safety and well-being of workers in human-robot collaboration settings, with a specific focus on environment, health, and safety (EHS) measures.
   ii. Factory Workers and Operators: Personnel working in factories where humans and robots interact, including assembly line workers, supervisors, and EHS managers.

e. PoC5
   i. Railway Operators: Stakeholders responsible for the operation and maintenance of passenger train systems, such as train companies and transportation authorities.
   ii. Maintenance Technicians and Engineers: Professionals involved in the maintenance and upkeep of passenger train components, interested in utilizing AI-enabled sensors for predictive maintenance actions.

By recognizing and addressing the specific interests and requirements of these different target audiences and stakeholders, OpenSwarm can tailor its dissemination activities, messages, and channels to maximize engagement, collaboration, and the adoption of its solutions.

2.1.3. Key Messages and Objectives

By conveying specific key dissemination messages and working towards a set of well-established objectives, OpenSwarm aims to create a significant impact in the target domains, drive innovation, and contribute to the advancement of swarm technologies. Next follows a list of the main key dissemination messages and objectives covered by OpenSwarm.

Key Messages:

- OpenSwarm's dissemination efforts aim to raise awareness about the potential of swarm technology in transforming various domains, including renewable energy communities, environmental conservation, industrial safety, and efficient mobility systems.
- The project highlights the practical outcomes and tangible results achieved through the implementation of swarm-based solutions in different use cases, showcasing the value and impact of distributed AI, sensor networks, and advanced algorithms.
- OpenSwarm emphasizes the importance of collaboration between humans and autonomous systems, promoting the idea of symbiotic relationships that enhance performance, safety, and efficiency in complex environments.
- The project advocates for open-source initiatives and knowledge sharing, enabling broader access to swarm technologies, fostering innovation, and accelerating their adoption across industries and research communities.

Objectives:

- Increase awareness and understanding of swarm technology by disseminating project findings, methodologies, and best practices to relevant stakeholders, including industry professionals, researchers, policymakers, and end-users.
- Showcase the practical applications and benefits of swarm-based solutions through demonstrations, case studies, and real-world implementations in diverse domains, encouraging the replication and adoption of OpenSwarm's approaches.

- Facilitate knowledge exchange and collaboration among stakeholders from different disciplines and sectors, fostering interdisciplinary approaches and promoting synergies between swarm technology and specific domain expertise.
- Provide accessible and comprehensive resources, including documentation, publications, and open-source tools, to support further research, development, and implementation of swarm-based solutions.
- Contribute to the long-term sustainability and impact of swarm technologies by engaging with standardization bodies, participating in relevant conferences and events, and actively promoting the integration of swarm principles into future policies and frameworks.

2.1.4. Dissemination Channels and Tools

While this will be further addressed in Section 3, the following list of dissemination channels and tools are planned by the OpenSwarm consortium:

- **Scientific Publications**: Publish research papers, articles, and case studies in reputable scientific journals and conferences related to relevant fields such as swarm robotics, AI, renewable energy, environmental conservation, industrial safety, and mobility systems.
- **Conferences and Workshops**: Organize and participate in conferences, workshops, and symposiums to present project findings, share knowledge, and engage with researchers, industry professionals, and policymakers. This includes both domain-specific conferences and multidisciplinary events.
- **Open-source Software Initiatives**: Share open-source software tools, libraries, and frameworks developed within the project, allowing researchers, developers, and industry partners to utilize and build upon the swarm technology advancements made in OpenSwarm.
- **Hackathons**: Organize hackathons and developer challenges to encourage innovation and collaboration around swarm protocols, algorithms, and

applications. These events bring together experts and enthusiasts to explore the potential of swarm technology in solving real-world problems.

- **Expert Workshops**: Conduct expert workshops and roundtable discussions involving domain experts, stakeholders, and policymakers to address specific challenges, share insights, and foster collaboration between swarm technology and different industries or sectors.
- **Tutorials and Training Programs**: Develop educational materials, tutorials, and training programs to disseminate knowledge about swarm technology, its principles, and practical implementation guidelines. These resources cater to both technical and non-technical audiences, enabling a broader understanding and adoption of swarm solutions.
- **Online Platforms and Communities**: Establish online platforms, forums, and communities where stakeholders, including researchers, practitioners, and industry partners, can engage in discussions, exchange ideas, and collaborate on swarm-related topics. These platforms serve as hubs for ongoing communication and knowledge sharing.
- **Social Media and Online Presence**: Forge a strong bond between dissemination and communication by harnessing the power of social media channels, project websites, and blogs to effectively distribute project updates, success stories, and noteworthy swarm technology developments. This strategic approach guarantees an expansive outreach and fosters active engagement with a diverse range of audiences, encompassing not only the general public, but also potential collaborators.
- **Collaboration with Industry Partners**: Collaborate with industry partners and stakeholders, within each PoC, to disseminate project outcomes within their networks and leverage their existing communication channels. This includes joint publications, presentations, and demonstrations of swarm-based solutions.

By employing a diverse range of dissemination channels and tools, OpenSwarm aims to reach its target audiences effectively, foster collaboration, and ensure the wide dissemination and adoption of project results and advancements in swarm technology.

2.2. Dissemination Plan

A comprehensive dissemination plan plays a crucial role in ensuring the effective sharing of project findings, engaging with stakeholders, and maximizing the impact of the project results. In this section, we outline the key components of the dissemination plan, including the overall timeline and milestones, allocation of responsibilities and resources, and monitoring and evaluation mechanisms.

The dissemination plan serves as a roadmap for OpenSwarm to systematically communicate and promote its research outcomes, innovative solutions, and practical applications of swarm technology across various domains. By strategically planning and executing dissemination activities, OpenSwarm aims to create awareness, foster collaborations, and drive the adoption of swarm-based approaches in many areas, such as renewable energy, environmental conservation, industrial safety, and mobility systems.

In the upcoming subsections, we will delve into the specific details of the dissemination plan. First, we will present the overall timeline and milestones, outlining the key stages and deliverables to be achieved throughout the project's duration. Next, we will discuss the allocation of responsibilities and resources, highlighting the roles and contributions of consortium members and partners in executing the dissemination activities. Lastly, we will explore the monitoring and evaluation mechanisms, which ensure the effectiveness and impact of the dissemination efforts.

Through a well-defined dissemination plan, OpenSwarm aims to create a lasting legacy by sharing knowledge, fostering collaborations, and driving advancements in the field of swarm technology. The following subsections will provide detailed insights into the

timeline, responsibilities, and evaluation methods that will guide the dissemination activities of the OpenSwarm project.

2.2.1. Overall Timeline and Milestones

The OpenSwarm project commenced on January 1, 2023, and is scheduled to run for a duration of 40 months. Throughout this timeline, the project is divided into three distinct phases, each marked by specific milestones that indicate the completion of key objectives and deliverables. The dissemination plan within the Overall Timeline and Milestones section emphasizes the strategic dissemination of OpenSwarm's results.

Phase 1 (M1-9): This initial phase primarily centers around WP1, which focuses on the identification and commitment to ethics, safety, and regulatory best practices. WP1 begins by systematically consolidating a comprehensive list of requirements gathered from consortium members, with a particular emphasis on PoC providers and external stakeholders. These requirements serve as the foundation for developing the system architecture of the OpenSwarm project. The conclusion of WP1 is marked by the publication of the requirements and architecture, representing Milestone M1 (requirements). This milestone signifies the completion of Phase 1 and sets the stage for subsequent phases. The publication of the requirements and architecture are foreseen to take place until M9.

In summary, Phase 1 contemplates the following dissemination activities:

- Initially define amendments to the 6TiSCH protocol stack, zero-touch security protocol, remote AI model update protocol, and pub/sub mechanism for constrained Coaty.
- Participate in protocol hackathons organized before the IETF118 meeting. Engage with the community, gather feedback, and establish a strong software architecture.

Phase 2 (M10-22): Phase 2 mostly encompasses the activities of WP2, WP3, and WP4. These work packages are dedicated to developing the core technologies of the three scientific pillars: orchestrating collaborative smart nodes (WP2), collaborative energy-aware AI (WP3), and energy-aware swarm programming (WP4). Each WP addresses distinct scientific objectives, with individual tasks contributing to various aspects of these objectives. The tasks within WP2-4 result in the generation of source code, which is unit tested as part of the task itself. The completion of each task is marked by the publication of deliverables D2.x, D3.x, and D4.x, respectively. Milestone M2 (core technology) coincides with the publication of these deliverables, signifying the readiness of the first version of the technologies for implementation and evaluation on the testbeds, which will take place until M22.

In summary, Phase 2 contemplates the following dissemination activities:

- Conclude the definition of amendments to the 6TiSCH protocol stack, zero-touch security protocol, remote AI model update protocol, and pub/sub mechanism for constrained Coaty.
- Participate in protocol hackathons organized before the IETF120 meeting. Engage with the community, gather feedback, and establish a strong software architecture.
- Organize an invited expert workshop in Paris. Present findings, assumptions, and solutions to a panel of 15 experts. Discuss and receive feedback on the results of SO1, SO2, and SO3.
- Outreach to high schools and universities: Introduce OpenSwarm into the curriculum, teach programming, electronics, and robotics. Provide kits of DotBots to institutions.

Phase 3 (M23-M40): Phase 3 encompasses the conclusion of WP5 and the activities of WP6. WP5 focuses on gathering the developed code base from WP2-4 and producing a unified OpenSwarm implementation. The functional testing of this implementation,

combined with core swarm enablers, takes place in a lab setting on the Kilobot and DotBot testbeds. WP6 is dedicated to applying the validated OpenSwarm code base to the five PoC use cases. The different PoCs stress different aspects of the technologies developed in WP2-4. The conclusion of WP6 is marked by the publication of deliverable D6.x, with Milestone M3 (validation) signifying the end of Phase 3 until M40. This milestone represents the successful application and validation of OpenSwarm's technologies within the PoC use cases.

In summary, Phase 2 contemplates the following dissemination activities:

- Submit a workshop proposal for ICRA 2025. Organize a workshop to bring the community together and showcase OpenSwarm technology.
- Organize a 2-day OpenSwarm hackathon at ADI Catalyst in Ireland. Utilize the 1,000 DotBot testbed, stress-test the ecosystem, and explore the platform's capabilities. Participants become OpenSwarm ambassadors.
- Organize a tutorial/workshop at the IEEE MRS conference. Combine it with hands-on sessions using the OpenSwarm code base and testbed remotely.
- Share code and repositories on GitHub under an open-source license. Enable usage by various entities.
- Maintain a case with hardware and pre-loaded software for demonstrations. Showcase OpenSwarm capabilities and user experience at different events.

Throughout the project's timeline, WP7 and WP8 run continuously, ensuring the timely achievement of objectives in full compliance with ethics, safety, and regulatory standards established in Task 1.3. WP7 focuses on the continuous impact of the project, particularly in terms of communication, dissemination, and exploitation. The teams involved in core research and innovation in WP2-4 are also engaged in the implementation, verification, and validation processes, allowing for continuous optimization based on testing feedback. Similarly, the teams involved in PoCs and testbed validation contribute their expertise to formalizing requirements in WP1 and

collaborate in WP2-4. This permeability between teams and tasks, encompassing a diverse range of expertise, is a key factor contributing to the overall success of the OpenSwarm project.

2.2.2. Allocation of Responsibilities and Resources

The OpenSwarm consortium consists of several partners, each playing a vital role in the dissemination activities of the project. The allocation of responsibilities and resources for these dissemination activities are outlined below:

- **INRIA**: As the project coordinator, **INRIA** takes the lead in coordinating and overseeing the overall dissemination strategy of OpenSwarm. They contribute their expertise in low-power wireless, constrained security, implementation, standardization, and robotics to ensure the successful dissemination of project outcomes. **INRIA** is responsible for organizing and participating in dissemination events, including workshops, conferences, and hackathons. They also contribute to the development of technical documentation, internet drafts, and source code repositories.
- **ADI**: **ADI** brings their expertise as a chip manufacturer and their knowledge in low-power wireless and AI microcontrollers to the dissemination activities. They contribute to the validation of OpenSwarm technologies on the DotBot testbed and actively participate in hackathons and workshops to showcase the project's outcomes.
- **IMEC**: With their expertise in low-power AI, sustainable energy-aware systems, and wireless connectivity, **IMEC** plays a crucial role in the dissemination of OpenSwarm. They contribute to the development of online edge learning techniques, knowledge distribution, and energy-aware hardware-software co-design. **IMEC** actively participates in conferences, workshops, and other dissemination events to share the project's results and findings.

- **ING**: As the lead partner for T7.2, **ING** takes on a significant responsibility in driving the dissemination activities of OpenSwarm. They leverage their expertise in robot design, multi-robot system coordination, and real-world deployments to contribute to the dissemination efforts. **ING** actively participates in hackathons, workshops, conferences and trade-fairs, sharing the project's outcomes and promoting its results to the wider community.
- **KUL**: **KUL** brings their expertise in low-power wireless, energy-aware hardware/software design, and zero-wire communication to the dissemination activities. They actively contribute to the development of zero-wire communication techniques and hardware/software energy-aware co-design. **KUL** participates in conferences, workshops, and other dissemination events to disseminate the project's achievements and engage with the relevant stakeholders.
- **SIG**: **SIG**, as a partner responsible for PoC lead and application performance monitoring, plays a crucial role in the dissemination of OpenSwarm outcomes. They leverage their expertise in the industrial domain, Coaty protocol, and low-power wireless solutions to contribute to the dissemination activities. **SIG** actively participates in trade-fairs, conferences, and workshops to showcase the project's results and impact.
- **SIA**: **SIA**, as another PoC lead partner, contributes their expertise in smart grid applications and OpenSwarm implementation to the dissemination activities. They actively participate in trade-fairs, conferences, and workshops to showcase the project's outcomes and engage with relevant stakeholders in the field.
- **UOS**: Leveraging their expertise in swarm intelligence, swarm robotics, and the Kilobot testbed, **UOS** actively contributes to the dissemination efforts of OpenSwarm. They play a crucial role in the development of swarm programming techniques, swarm intelligence algorithms, and the validation of the project's outcomes on the Kilobot testbed. **UOS** participates in conferences, workshops, tutorials, and other dissemination and outreach events to share their expertise and promote the project's achievements.

- **WE**: **WE**, as a PoC lead partner specializing in IoT solutions for smart marinas and connected buoy, actively contributes to the dissemination activities of OpenSwarm. They showcase the project's outcomes through trade-fairs, conferences, and workshops. **WE**'s expertise in constrained AI and hands-on experimentation adds value to the dissemination efforts.

Each partner within the consortium is responsible for actively participating in dissemination events, contributing to technical documentation and internet drafts, organizing workshops and hackathons, and showcasing the project's results and achievements to the target audience. The allocation of responsibilities and resources ensures a comprehensive and collaborative approach to dissemination, enabling the project to reach its intended audience effectively.

2.2.3. Monitoring and Evaluation Mechanisms

Monitoring and evaluating the dissemination activities in OpenSwarm is crucial to ensure the effectiveness and impact of the project's communication efforts. It allows for the assessment of the reach and engagement of the target audience, as well as the identification of areas that may require improvement or adjustment. In this section, we outline the monitoring and evaluation mechanisms to be implemented, incorporating the key performance indicators (KPIs) relevant to the project's dissemination plan.

1. **Scientific Publications:**
   - **KPI1.1.** Number of peer-reviewed scientific journal publications related to OpenSwarm technologies and findings (20).
   - **KPI1.2.** Number of peer-reviewed scientific conference publications related to OpenSwarm technologies and findings (30).
2. **Engagement at Conferences:**
   - **KPI2.1.** Number of conferences and workshops where OpenSwarm is represented through presentations, demonstrations, or participation (4).

- **KPI2.2.** Audience engagement metrics, such as the number of questions generated during conference sessions (6).

3. **Standardization:**
   - **KPI3.1.** Active involvement in relevant standardization bodies and committees related to swarm robotics, low-power wireless communication, and AI technologies (2).
   - **KPI3.2.** Contribution to the development of standards or guidelines through OpenSwarm's expertise and technological advancements (2).
4. **Protocol Hackathons:**
   - **KPI4.1.** Number of protocol hackathons organized or participated in by OpenSwarm consortium members (2).
   - **KPI4.2.** Collaborative engagement with external stakeholders in the development, testing, and refinement of OpenSwarm protocols and technologies during hackathon events (2).
   - **KPI4.3.** Attendance and engagement metrics, including the cumulative number of participants in the protocol hackathons (50).
5. **Open-Source Software:**
   - **KPI5.1.** Number of OpenSwarm software repositories hosted on platforms such as GitHub, indicating the availability and accessibility of project deliverables (6).
   - **KPI5.2.** Community engagement and contributions to the open-source repositories, including bug reports, feature requests, and code contributions (3).
6. **Invited Expert Workshop:**
   - **KPI6.1.** Successful organization and participation in an invited expert workshop, bringing together domain experts, stakeholders, and key decision-makers in the field of swarm robotics and AI (2).

- **KPI6.2.** Collaboration and knowledge exchange achieved during the workshop, leading to potential partnerships, synergies, or insights for further project development and dissemination (2).

7. **OpenSwarm ICRA Workshop:**
   - **KPI7.1.** Organization of an OpenSwarm workshop at the IEEE International Conference on Robotics and Automation (ICRA), showcasing the project's outcomes, methodologies, and future directions (1).
   - **KPI7.2.** Attendance and engagement metrics, including the number of participants in the workshop (30).
   - **KPI7.3.** Publication of workshop proceedings and related materials to extend the reach of OpenSwarm beyond conference attendees (1).
8. **OpenSwarm Hackathon and MRS Tutorial/Workshop:**
   - **KPI8.1.** Organization of OpenSwarm hackathons and tutorial/workshop sessions at relevant events, such as the ADI Catalyst and the IEEE International Symposium on Multi-Robot and Multi-Agent Systems (MRS) (1).
   - **KPI8.2.** Attendance and engagement metrics, including the number of participants in the OpenSwarm Hackathons (20).
9. **Outreach to High Schools and Universities:**
   - **KPI9.1.** Distribution of OpenSwarm educational kits to a number of high schools and universities, fostering interest and engagement in swarm robotics and AI among students (6).
   - **KPI9.2.** Feedback and testimonials from educators and students on the impact of the OpenSwarm educational materials, including practical experiments, tutorials, and learning resources (6).
10. **Roadshow:**
    - **KPI10.1.** Number of events and locations covered during the OpenSwarm roadshow, showcasing the project's technologies, use cases, and benefits to diverse audiences (4).

- **KPI10.2.** Engagement metrics at roadshow events, including the number of attendees with project representatives (50).

These KPIs will guide the monitoring and evaluation of the dissemination plan throughout the project's duration. Regular assessment and analysis of the collected data will enable the consortium to gauge the success of their dissemination efforts, identify areas for improvement, and make informed decisions to maximize the impact of OpenSwarm's outcomes.

3. Dissemination Activities

Dissemination activities play a crucial role in maximizing the impact and visibility of the OpenSwarm project. In this section, we outline a comprehensive and specific list of activities to effectively disseminate the project's results and engage with various stakeholders. The dissemination strategy encompasses a wide range of activities, including scientific publications, participation in conferences, standardization efforts, protocol hackathons, open-source software, workshops, outreach programs, and a roadshow. By strategically leveraging these activities, OpenSwarm aims to foster knowledge exchange, promote adoption, and facilitate collaboration within the research community, industry partners, and educational institutions. The following subsections provide an overview of the key dissemination activities planned throughout the project duration.

3.1. Scientific Publications

Table 1 extends on the journals and conferences targeted by the OpenSwarm consortium during the proposal writing process. It includes additional venues that should be considered to maximize the dissemination impact of the project. This list covers a wide range of topics related to networking and orchestration of collaborative smart nodes, AI, constrained AI, learning, as well as multi-robot systems, swarms, and micro-robotics.

Table 1. List of publication venues of particular relevance during dissemination.

	Contributions to Networking and Orchestration of Collaborative Smart Nodes	**Contributions to AI, Constrained AI, Learning**	**Contributions to Multi-Robot Systems, Swarms, and Micro-Robotics**

Targeted Journals	IEEE Internet of Things Journal	Taylor & Francis Applied Artificial Intelligence	IEEE Transactions on Robotics
	Elsevier Ad Hoc Networks	IEEE Embedded Systems Letters	Wiley Journal of Field Robotics
	IEEE Communications Surveys & Tutorials	Elsevier Artificial Intelligence	Springer Swarm Intelligence
	IEEE/ACM Transactions on Networking	IEEE Transactions on Neural Networks and Learning Systems	Sage International Journal of Robotics Research
	IEEE Transactions on Cloud Computing	IEEE Transactions on Emerging Topics in Computing	Springer Autonomous Robots
	MDPI Sensors		Elsevier Robotics and Autonomous Systems
Targeted Conferences	ACM Conference on Embedded Networked Sensor Systems (SenSys)	AAAI Conference on Artificial Intelligence	IEEE International Conference on Robotics and Automation (ICRA)
	ACM Information Processing in Sensor Networks (IPSN)	ACM International Conference on Autonomous Agents and Multiagent Systems (AAMAS)	IEEE International Symposium on Multi-robot and Multi-agent Systems (MRS)
	ACM International Conference on Embedded Wireless Systems and Networks (EWSN)	Conference on Neural Information Processing Systems (NeurIPS)	Springer International Conference on Swarm Intelligence (ANTS)
	IEEE International Conference on Communications (ICC)	IEEE International Conference on Artificial Intelligence Circuits and Systems	Robotics: Science and Systems (RSS)
	IEEE Global Telecommunications Conference (GLOBECOM)	Intelligent Systems Conference (IntelliSys)	IEEE/RSJ International Conference on Intelligent

			Robots and Systems (IROS)
			International Symposium on Distributed Autonomous Robotic Systems (DARS)

3.2. Engagement at Conferences

Engagement at conferences plays a crucial role in the dissemination strategy of the OpenSwarm project, providing a platform for sharing knowledge, exchanging ideas, and fostering collaborations with researchers, industry experts, and practitioners in the field of robotics, AI, and networking. By actively participating in prominent conferences, the OpenSwarm consortium aims to showcase its advancements, receive feedback, and establish itself as a leading contributor in the domain.

One of the flagship conferences that the OpenSwarm consortium targets for engagement is the **IEEE International Conference on Robotics and Automation (ICRA)**. With its global reach and reputation as one of the premier robotics conferences, ICRA offers an ideal platform for presenting scientific findings, technological innovations, and practical applications in the field. The consortium aims to engage in this top-rank conference in its 2023, 2024 and 2025 editions. By leveraging the conference's large and diverse audience, the consortium can effectively disseminate the project's research outcomes and attract interest from researchers and industry professionals alike.

Another significant conference on the radar of the OpenSwarm consortium is the **International Conference on Intelligent Robots and Systems (IROS)**. As a leading forum for robotics researchers and practitioners, IROS provides an excellent opportunity to showcase the advancements and applications of OpenSwarm technology. The consortium aims to participate in IROS editions 2024 and 2025, presenting research

papers, delivering presentations, and organizing special sessions or workshops to engage with the conference attendees.

Furthermore, the consortium plans to actively participate in other conferences and events dedicated to swarm robotics, AI, and networking. These include conferences, such as those mentioned in Table 1. By targeting these conferences, the consortium can reach a diverse audience of researchers, practitioners, and industry representatives, thereby maximizing the dissemination impact of the OpenSwarm project. Through active participation at conferences, the OpenSwarm consortium aims to disseminate its research outcomes, receive valuable feedback, and foster collaborations with leading experts in the field.

3.3. Standardization

Standardization is a crucial aspect of the OpenSwarm project, as it ensures interoperability, compatibility, and widespread adoption of the developed technologies. The consortium recognizes the importance of aligning with existing standards and actively contributing to the standardization process to facilitate integration and collaboration with other robotics platforms and systems.

One key area where standardization efforts are focused is the communication and networking protocols used by OpenSwarm. The consortium aims to **work closely with recognized standardization bodies, such as the Institute of Electrical and Electronics Engineers (IEEE) and the Internet Engineering Task Force (IETF)**, to establish common protocols and frameworks. These standards will enable seamless integration of OpenSwarm with other robotics systems and facilitate the development of robust and scalable swarm applications.

Additionally, the consortium recognizes the role of the Robot Operating System (ROS) as a widely adopted framework in the robotics community. ROS provides a standardized environment for developing and integrating robot software components. **OpenSwarm aims to leverage the capabilities of ROS and contribute to its development by**

providing ROS-compatible interfaces and modules for seamless integration with the OpenSwarm ecosystem. This collaboration between OpenSwarm and ROS further strengthens the standardization efforts and promotes the adoption of OpenSwarm technologies within the ROS community.

Furthermore, the consortium acknowledges the importance of collaboration with other projects and initiatives in the robotics domain to align and harmonize efforts. By actively participating in relevant working groups, technical committees, and consortia, OpenSwarm can contribute to the development of common standards and guidelines. These collaborations may include initiatives, such as the **Robotics Industry Association (RIA), the International Federation of Robotics (IFR)**, and other regional or domain-specific associations.

3.4. Protocol Hackathons

Protocol hackathons play a crucial role in the OpenSwarm project, providing a unique opportunity for collaboration, innovation, and engagement with the wider community of protocol design and implementation experts. OpenSwarm actively participates in renowned hackathons, including those organized by the IETF.

The IETF hackathons are highly esteemed events, attracting over 300 individuals who possess extensive knowledge and expertise in protocol design and implementation. These hackathons serve as an excellent platform for the OpenSwarm consortium to connect with the wider community, showcase their technology, gather valuable feedback, and establish strong software architecture.

The OpenSwarm project intends to actively participate in the hackathons associated with IETF meetings, such as IETF118 and IETF120. During these events, the OpenSwarm consortium will propose specific topics and assemble dedicated teams to collaborate on them. The intensive two-day hackathon format allows for concentrated efforts and facilitates rapid progress in protocol development and implementation.

By participating in IETF hackathons, the OpenSwarm project not only benefits from hands-on exposure to the community, but also receives valuable feedback from domain experts. This early engagement with the wider community enables the consortium to refine their technology, validate their approaches, and ensure alignment with established standards and best practices.

It is worth noting that IETF hackathons are free events for IETF attendees, eliminating the need for additional funding for participation. The OpenSwarm consortium embraces these hackathons as an invaluable opportunity to strengthen their collaboration, establish connections, and contribute to the advancement of protocols and networking technologies.

3.5. Open-Source Software

The OpenSwarm project recognizes the immense value of open-source software in driving innovation, fostering collaboration, and maximizing the impact of its technology. As a testament to its commitment, the consortium aims to make all the code it develops openly available, promoting accessibility, reproducibility, and broad usage across various entities.

To achieve this, **the OpenSwarm consortium has already established a GitHub platform**[1], where they will share their code under a carefully chosen open-source license. The license of each subproject shared will be selected in close collaboration among the consortium members, namely those responsible for their development and maintenance, to ensure that it aligns with their objectives of widespread adoption and utilization. By adopting an open-source approach, the consortium intends to empower diverse stakeholders, including open-source projects, academic research communities, hobbyists, educational institutions, and even commercial product development.

[1] https://github.com/organizations/openswarm-eu/

The consortium brings substantial experience in contributing to open-source projects. Notably, they have led major initiatives, like OpenWSN and Coaty, and actively participated in prominent projects, such as ROS, SWUpdate, and OpenTelemetry. Leveraging their expertise and established collaborations, the OpenSwarm project is well-positioned to contribute to the open-source ecosystem and facilitate knowledge sharing, innovation, and community engagement.

By embracing open-source principles, the OpenSwarm consortium aims to impact the future of research communities and products. Open access to the codebase not only fosters transparency but also invites collaboration and feedback from the wider community. Researchers can build upon the OpenSwarm technology, accelerating advancements in the fields of swarm robotics, collaborative AI, and constrained AI. Educational institutions can integrate OpenSwarm into their curricula, providing students with practical exposure to embedded systems, wireless communication, and AI programming. Commercial entities can leverage the open-source technology to develop innovative products and services.

3.6. Invited Expert Workshop

As the OpenSwarm project progresses and reaches its mid-point, it becomes crucial to validate and refine its findings, assumptions, and solutions through the invaluable insights of a panel of experts. To facilitate this important milestone, **the consortium plans to organize an invited expert workshop immediately following the all-hands meeting in month 20**.

The workshop will take place in Paris at INRIA, approximately around September 2024, shortly after the Olympics. This strategic timing will ensure the availability of key participants and capitalize on the consortium's presence in Paris for the all-hands meeting. The invited expert workshop will span two days and serve as an opportunity for in-depth discussions, presentations, hands-on sessions, and panels revolving around the findings of the scientific pillars of the project.

To curate a diverse range of perspectives, the OpenSwarm consortium will invite a carefully selected list of 15 experts, with 5 experts representing each scientific pillar, namely (i) SO1. Orchestration of Collaborative Smart Nodes; (ii) SO2. Collaborative Energy-Aware AI; and (iii) SO3. Energy-Aware Swarm Programming. These experts will bring their specialized knowledge, insights, and experiences to enrich the discussions and provide valuable feedback.

The expected attendance for the workshop is anticipated to be around 30 people, as the event coincides with the consortium's all-hands meeting. This intimate setting will foster collaborative exchanges and enable meaningful interactions among the invited experts and consortium members. Additionally, the selected experts will serve as ambassadors for the OpenSwarm project, sharing their workshop experiences, findings, and insights within their respective institutions and communities.

By hosting the invited expert workshop, the OpenSwarm consortium aims to leverage the collective wisdom of these renowned experts to further refine and validate their research outcomes. The workshop's discussions and feedback will shape the project's direction, strengthen its methodologies, and enhance the potential impact of OpenSwarm on the field of networking, AI, and multi-robot systems.

3.7. OpenSwarm ICRA Workshop

The IEEE International Conference on Robotics and Automation (ICRA), as already discussed before, is a premier conference in the field of robotics and automation, attracting researchers, practitioners, and industry professionals from around the world. The conference serves as a platform for presenting the latest advancements, exchanging ideas, and fostering collaborations in robotics and automation research.

With a rich history spanning several decades, ICRA has evolved into a prominent event that showcases cutting-edge research and innovation in the field. Over the years, the conference has witnessed a significant increase in the number of attendees, indicating

its growing influence and relevance in the robotics community. In recent editions, each ICRA edition has attracted thousands of participants, including renowned researchers, industry experts, and leading professionals.

The OpenSwarm consortium recognizes the importance of ICRA as a prime opportunity to disseminate the project's results and engage with the wider robotics and automation community. Leveraging their previous experience in organizing workshops, the consortium aims to host an OpenSwarm Workshop during ICRA. This workshop will provide a dedicated platform for sharing the advancements and outcomes of the project, fostering discussions, and promoting collaboration among researchers, practitioners, and industry stakeholders.

By organizing the OpenSwarm Workshop at ICRA, the consortium aims to leverage the conference's established reputation and extensive reach to maximize the dissemination impact of the project. The workshop will feature presentations from project members, highlighting key findings, technological advancements, and practical applications of OpenSwarm. Panel discussions and interactive sessions will facilitate knowledge exchange and provide an opportunity for participants to actively engage with the project team.

The consortium foresees to organize a workshop at **ICRA 2025, which will be held in Atlanta (GA), USA, between the 17 and the 23 May 2025**. Building upon the success of the previous ICRA workshops organized by consortium members, the OpenSwarm Workshop is expected to attract a significant number of attendees. The workshop aims to surpass the achievements of the ICRA 2022 IFRRIA (Innovation in Forestry Robotics: Research and Industry Adoption) Workshop, which had **ING**'s involvement, which garnered 12 presentations, featured 6 panellists, and attracted 313 registrations as well as the ICRA 2021 Robot Swarms in the Real World workshop, which had **UOS**'s involvement, and brought together more than 300 participants and offered 8 invited talks, panel discussions and poster/demo sessions. With the broader scope of OpenSwarm and its innovative contributions to the fields of networking and

orchestration of collaborative smart nodes, AI and constrained AI, as well as multi-robot systems, swarms, and micro-robotics, the OpenSwarm Workshop at ICRA is poised to make a substantial impact and contribute to the advancement of the robotics and automation domain.

3.8. OpenSwarm Hackathon

As the OpenSwarm project progresses towards its advanced stages, the consortium plans to host the all-hands meeting "A4" at ADI's Catalyst collaboration hub in Ireland. This state-of-the-art facility, built in 2021, provides an ideal setting for collaborative events, such as hackathons, boasting configurable spaces, meeting pods, whiteboards, and a stand-up auditorium. It is within this innovative environment that the **OpenSwarm consortium will organize a dynamic 2-day hackathon following the all-hands meeting**.

The hackathon aims to bring together approximately 30 participants who will have the opportunity to leverage the fully functional 1,000 DotBot testbed, housed within the Catalyst collaboration hub. This testbed serves as a vital component in the OpenSwarm ecosystem, providing a real-world platform to conduct experiments and expeditions defined during the hackathon.

The primary objective of the hackathon is to stress-test the entire OpenSwarm ecosystem, encompassing networking and application management, AI acceleration, and the swarm compiler/programming environment. Participants will actively engage with the testbed, exploring its capabilities, and gaining valuable insights into the platform's functionalities and potential applications. Through hands-on activities, collaborative problem-solving, and expedition-based challenges, each participant will leave the hackathon with a comprehensive understanding of the OpenSwarm platform.

Moreover, the hackathon will serve as an opportunity to foster collaboration and community engagement. Participants will not only become well-versed in the

OpenSwarm technology, but also act as ambassadors, spreading awareness and knowledge within their respective institutions and communities. Furthermore, the consortium aims to initiate discussions on expanding the presence of OpenSwarm testbeds to other institutions, inviting members from these institutions to join the hackathon and further contribute to the project's ecosystem.

3.9. OpenSwarm MRS Tutorial and Workshop

The IEEE International Symposium on Multi-Robot and Multi-Agent Systems (MRS) is a prestigious event that brings together renowned researchers, practitioners, and experts in the field of multi-robot systems and swarms. As a leading symposium in this domain, MRS serves as a platform for presenting cutting-edge research, exchanging ideas, and discussing the latest advancements in multi-robot and multi-agent systems.

Organized biennially, MRS has gained increasing relevance and recognition over the years. The symposium attracts a growing number of participants, reflecting the expanding interest and significance of multi-robot systems and swarms in various applications. Researchers and professionals from academia, industry, and government sectors convene at MRS to share their insights, discuss challenges, and explore new avenues for collaboration in this dynamic field.

Recognizing the importance of MRS as a prime venue to disseminate the advancements made within the OpenSwarm project, **the consortium aims to organize a dedicated tutorial/workshop at the 2025 edition of the symposium**. The workshop will focus on showcasing the OpenSwarm technology, along with practical demonstrations and hands-on sessions for utilizing the OpenSwarm code base and its remote testbed.

By organizing a workshop at MRS, the consortium aims to leverage the symposium's established reputation and engaged community to maximize the dissemination impact of the OpenSwarm project. The workshop will provide a unique opportunity to present

the project's findings, share experiences, and engage in discussions with experts and peers working in the field of multi-robot systems and swarms.

While the specific details, such as the location and schedule of the workshop, are yet to be determined as the 2025 edition is still forthcoming, MRS typically takes place in November. The consortium will carefully plan and tailor the workshop to align with the symposium's theme and objectives, ensuring that it provides valuable insights and practical knowledge to the participants.

Moreover, the OpenSwarm workshop at MRS will highlight the innovative aspects of the project, such as the utilization of the 1,000-device testbed located in Ireland. This unique testbed, which will be accessible remotely, will offer an exceptional opportunity to showcase the scalability, robustness, and real-world applicability of the OpenSwarm technology.

By organizing a workshop at the 2025 edition of MRS, the OpenSwarm consortium aims to contribute to the symposium's continued growth and influence in the field of multi-robot systems and swarms. The workshop will foster collaboration, spark discussions, and pave the way for future advancements in this exciting area of research and development.

3.10. Outreach to High-Schools and Universities

As part of the OpenSwarm project's commitment to fostering interest and expertise in the fields of embedded systems, AI, and robotics, the consortium is dedicated to conducting outreach activities at high schools and universities. This initiative is driven by the recognition of the challenges in recruiting engineers proficient in these areas, particularly female engineers. By engaging with students at an early stage, OpenSwarm aims to cultivate a long-term impact on the scientific community and address the skills gap in these specialized fields.

One of the key activities in the outreach program is the **participation of the OpenSwarm consortium in the Robotics Craftsmanship International Academy (RobotCraft) summer program**. RobotCraft, which has been running since 2016 under the coordination of **ING**, serves as an exemplary platform for imparting practical knowledge and skills in building and programming mobile robots. The program embraces popular tools, such as Arduino and the Robot Operating System (ROS), providing participants with a comprehensive two-month experience. Since its inception, RobotCraft has garnered significant attention and participation from students and universities worldwide. With over 350 students from more than 100 universities having taken part in this collective summer internship, RobotCraft has established itself as a renowned and impactful program in the robotics community. The experience gained through RobotCraft empowers students to delve into the intricacies of robotics and equips them with valuable hands-on experience in constructing and programming mobile robots. Building upon the success of RobotCraft, the OpenSwarm consortium aims to leverage this valuable platform to kick-start its outreach activities. By integrating OpenSwarm into the curriculum of participating institutions, the consortium envisions providing students with exposure to the fascinating realms of embedded systems, wireless technologies, AI, and coordinated swarm robotics. The allure of the DotBots, with their robotic capabilities and swarm coordination, adds an element of magic to capture students' interest and imagination.

To further support educational institutions in adopting OpenSwarm, the consortium has **initiated discussions with various high schools and universities, including Paul Valery and Rodin high schools in Paris, as well as ESIROI, ENSTA, UC Berkeley, and Portland State Universities**. The aim is to collaborate closely with these institutions and facilitate the development of dedicated courses centred entirely on OpenSwarm. By providing instructors with affordable kits consisting of around a dozen DotBots, students can actively participate in enhancing and expanding their understanding of programming, electronics, and robotics.

Through the outreach activities, the OpenSwarm consortium seeks to empower a new generation of engineers and researchers with the necessary skills and knowledge to navigate the evolving landscape of embedded systems, AI, and robotics. By fostering early engagement and integrating OpenSwarm into educational curricula, the consortium aims to bridge the skills gap and contribute to the growth and diversity of talent in these vital scientific fields.

3.11. Roadshow

To maximize the reach and impact of the OpenSwarm project, the consortium recognizes the importance of conducting a roadshow to showcase the user experience, capabilities, and performance of OpenSwarm. To facilitate these demonstrations, the consortium will maintain a dedicated case containing all the necessary hardware and pre-loaded software components.

The roadshow will involve consortium members and designated ambassadors who will utilize the demonstration kit to exhibit OpenSwarm in various settings. This portable case will serve as a powerful tool, allowing for interactive demonstrations and engaging presentations at different events, institutions, and conferences.

By utilizing the roadshow kit, consortium members and ambassadors can effectively convey the potential of OpenSwarm to a diverse audience. The kit will enable them to provide hands-on experiences, interactive sessions, and comprehensive insights into the features and functionalities of OpenSwarm. These demonstrations will help bridge the gap between theory and practice, allowing attendees to witness the power and versatility of collaborative smart nodes and multi-robot systems firsthand.

The roadshow will serve as a means to generate awareness, stimulate interest, and foster collaborations with researchers, industry professionals, and potential end-users. **Consortium members and ambassadors will leverage the roadshow kit to deliver informative presentations, engage in discussions, and showcase real-world use cases that highlight the benefits and applications of OpenSwarm technology**.

Through the strategic deployment of the roadshow, the OpenSwarm consortium aims to extend its reach and create opportunities for collaboration and knowledge exchange. This initiative will enable a wider audience to understand and appreciate the value of OpenSwarm, while also fostering partnerships and collaborations that can contribute to the further development and adoption of the technology.

By leveraging the portability and versatility of the demonstration kit, the OpenSwarm roadshow will effectively promote the project's objectives, attract new stakeholders, and establish OpenSwarm as a prominent player in the field of collaborative smart nodes and multi-robot systems.

4. Reports from Dissemination Events

Table 2 summarizes the running list of OpenSwarm dissemination activities, which is followed by a series of reports of the most important ones falling in the categories addressed in the previous section. This table is an organized version of the running list made accessible to the consortium in OpenSwarm's Teams, which replicates the dissemination table available in the EU participant portal.

Table 2. Running list of OpenSwarm dissemination activities.

Partner[2]	Dissemination activity name [3]	What?[4]	Who?[5]	Why?[6]	Link[7]	Status[8]	Date[9]
Consortium	YouTube project account	Other	Citizens	Sharing project videos on YouTube can increase visibility and exposure, demonstrate the capabilities and advancements, and can open up opportunities for feedback and collaboration.	https://www.youtube.com/@openswarm_eu	Delivered	01/01/2023

2 Inria, ADI, IMEC, ING, KUL, SIG, SIA, UOS, WE, Consortium.

3 Short title of the activity.

4 Conferences, Education and training events, Meetings, Clustering activities, Collaboration with EU-funded projects, Other scientific collaboration, Other scientific cooperation, Other.

5 Research communities, Industry, business partners, Innovators, Investors, International organisation (UN boddy, OECD, etc.), EU Institutions, National authorities, Regional authorities, Local authorities, Civil society, Citizens, Specific end user communities, Other.

6 Short description of the dissemination activity, up to 200 characters.

7 Hyperlink where the dissemination activity or proof of such activity can be found.

8 Cancelled, Delivered, Ongoing, Postponed.

9 Date related with the last status update of the dissemination activity.

Consortium	Twitter project account	Other	Citizens	Sharing updates on Twitter is a widely adopted way to communicate and update followers in real-time, to increase the visibility and reach a large, engaged audience. Furthermore, it is also an additional opportunity for interaction and feedback from experts and peers.	https://twitter.com/openswarm_eu	Delivered	01/01/2023
Consortium	LinkedIn project account	Other	Citizens	Sharing updates on LinkedIn is a popular way to reach to professional and industry-specific network. It allows to increase the visibility and credibility of the project within the professional community, allowing to engage with experts and peers. Furthermore, if offers networking and collaboration opportunities with other industry professionals.	https://www.linkedin.com/company/openswarm-eu/	Delivered	01/02/2023
ING	LinkedIn post in ING's account about the OpenSwarm Kick-off meeting	Other	Citizens	Publicly sharing that the kick-off meeting of OpenSwarm took place for increased transparency and accountability. This is also an opportunity to generate	https://www.linkedin.com/feed/update/urn:li:activity:7024743816330919936/	Delivered	27/02/2023

				excitement and interest among stakeholders.			
UOS	(31/06/2023 update: Article accepted) Scientific article submitted to IROS 2023 about sharing the control of robot swarms among multiple human operators	Conferences	Research communities	The article from Genki Miyauchi, Yuri K. Lopes and Roderich Gross, entitled as "Sharing the Control of Robot Swarms Among Multiple Human Operators: A User Study", presents an important stepping stone for the OpenSwarm project as it investigates the ability of multiple operators to dynamically share the control of robot swarms and the effects of different communication types on performance and human factors.		Delivered	02/03/2023
Inria	Participation in EUCloudEdgeIoT launch meeting	Meetings	Research communities	Discussion about project launch.		Delivered	08/02/2023
Inria	Article of Thomas about OpenSwarm organized and published by Inria	Other	Other	Global presentation of the project.	https://www.inria.fr/en/openswarm-highly-innovative-project-internet-things	Delivered	16/03/2023

Inria	Poster Abstract prepared by Thomas that highlights Kinéis as an example for IoT via satellite	Conferences	Research communities	This poster showcases the performance of Kinéis as a representative example for IoT applications using satellite technology, with an end-to-end latency of 45 minutes, battery lifetime of 1,000 packets, and end-to-end reliability of 23%/54%/99% with 1/10/18 repetitions.		Ongoing	
WE	Participation in EUCloudEdgeIoT launch meeting	Meetings	Research communities	Discussion about communication.		Delivered	08/03/2023
Inria	Participation in EUCloudEdgeIoT days in Brussels, 10-11 May-2023	Meetings	Research communities			Delivered	11/05/2023
Inria	Submission to the Expression of Interest "Swarm Robotics is the Next Frontier in Cloud-to-Edge-to-IoT Research" to the EUCloudEdgeIoT community leaders	Other	Research Communities				
UOS	OpenSwarm presentation as part of ICRA	Other	Research Communities	Increase awareness of OpenSwarm project		Delivered	30/05/2023 - 01/06/2023

	2023 exhibition booth						
UOS	OpenSwarm late-breaking research poster presented at ICRA 2023	Conferences	Research Communities	Share latest user study findings of using human-swarm interaction study		Delivered	01/06/2023

Selected dissemination activities listed in Table 2 are further elaborated in the subsequent sections, building upon the comprehensive coverage of dissemination activities and their respective categories discussed in Section 3.

4.1. Scientific Publications Reports

4.2. Conference Engagement Reports

4.3. Standardization Reports

4.4. Protocol Hackathon Reports

4.5. Open-Source Software Reports

4.6. Invited Expert Workshop Report

4.7. OpenSwarm ICRA Workshop Report

4.8. OpenSwarm Hackathon Report

4.9. OpenSwarm MRS Tutorial and Workshop Report

4.10. Outreach Reports to High-Schools and Universities

4.11. Roadshow Reports

5. Conclusion

This document provided an overview of the OpenSwarm project's beneficiaries' strategy and concrete actions regarding the dissemination of project results. It is a working document that will be updated during the project.

References