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Drones4Safety

Research & Innovation Action (RIA)

Inspection Drones for Ensuring Safety in Transport Infrastructures

Report on Dissemination, Communication and Exploitation activities

D8.3

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|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---|
| Dissemination Level | | |
| PU | Public | ✓ |
| CO | Confidential, only for members of the consortium (including the Commission Services) | |

Change Log

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| 2 | 30/11/2022 | Damiano Taurino | DBL | Final version |

1 Executive Summary

This document aims at reporting the communication, dissemination and exploitation actions implemented along the 30 months of the Drones4Safety project, that means covering the period from June 2020 to November 2022.

It is built according to what was stated in D8.2 Dissemination, Communication and Exploitation Plan: it offers an overview of the activities carried out during the overmentioned period and evaluates the impact and effectiveness of them with respect to the goals and KPIs established by the project.

The main communication and dissemination actions carried up to M30 can be differentiated in the following:

- Communication and Dissemination products: graphic identity, website, blog, visual gallery, social media channels, graphic material, gadgets, presentations, scientific papers, videos, media coverage;
- Dissemination events: third-party events and conferences; events organized by D4S;
- Exploitation activities: exploitation outcome; exploitation activities; individual partner exploitation activities.

It also investigates the constraints and impediments faced during the beforementioned period. For those reasons this deliverable represents a report and an update of the Drones4Safety CDEP that will guide the Drones4Safety communication and dissemination activities in the last months of the project.

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Acronyms

| Acronym | Description |
|---------|----------------------------|
| AI | Artificial Intelligence |
| D | Deliverable |
| D4S | Drones4Safety |
| EC | European Commission |
| EU | European Union |
| KoM | Kick-off Meeting |
| KPIs | Key Performance Indicators |
| M | Month |
| WP | Work Package |

2 Introduction

Drones4Safety is a H2020 project aiming to increase the safety of the European civil transport system by developing an innovative solution: a cooperative, autonomous and continuously operating drone system inspecting railways and bridges thanks to artificial intelligence. In this system energy is harvested from overhead power or rail lines in the proximity of the desired infrastructure.

For its complexity the project addresses a wide range of stakeholders and users.

The dissemination, communication and exploitation activities are key tools to ensure that the knowledge and information generated by the project will be available to all interested stakeholders and can be reused and replicated in other projects or domains. For these reasons it has been necessary to establish a detailed plan of the overall approach, objectives and strategies to pursue in D8.2 Dissemination, Communication and Exploitation plan, together with a procedure to monitor, assess and improve these activities.

A variety of communication means have been employed for reaching these goals throughout the project's life cycle, ranging from communication materials (print materials, website, news, video, social media) to dissemination events (workshops, conferences, demonstrations) and exploitation activities. Further actions are still ongoing and will be finalized by the end of the project duration.

The current document is part of the monitoring and reporting activities. It describes the communication and dissemination means developed and applied as well as exploitation activities pursued. It comprises four main parts:

- I part summarizes the communication and dissemination approach, strategy and goals.
- II part focuses on the communication and dissemination products realized.
- III part lists the events attended and organized.
- IV part offers a global view of the exploitation activities, including the individual partners' exploitation actions.

At the end of the document, conclusions are exposed based on the Key Performance Indicators (KPIs).

Further to this, supportive information is presented annexes to the body of the document (acronyms, figures and press releases).

3 Communication and dissemination overview

Communicating the project's concept and goals and disseminating its results are central pursuits of the Drones4Safety project as they contribute massively to maximize its impact. With this purpose in mind, at the beginning of the project within WP8 a specific strategy has been defined. It is built upon four main pillars:

- 1) Communication and dissemination goals: identification of the overall objectives of the project dissemination and communication, and the ways to achieve them. In Drones4Safety, depending on the phase of the project and on the expected involvement of the stakeholders, four high-level objectives are pursued:
 - Raising awareness around the project
 - Generating understanding
 - Engaging stakeholders
 - Ensuring impact
- 2) Target audience: categorization of key stakeholders as well as identification of their needs and interests towards the project. The Drones4Safety segmentation comprises three main cluster with a different level of interest in the topic:
 - General public
 - Specialized Audience
 - Policy Makers
- 3) Key messages: definition of valuable messages based on interests and needs of the different targets in the various phases of the project. Indeed, Drones4Safety comprises three different project phases: the first focused on informing on the project, the second focused on informing on the progress and results of the project, and the third focused on making results available and fostering their adoption. What is Drones4Safety, its importance and concept are key messages at the core of the project communication in every phase.
- 4) Dissemination approach: match between the project goals, target audience, and the dissemination means most appropriate to elicit the desired outcome from the intended audience. Specifically, the Drones4Safety approach consists in the implementation of activities based on the status of the project and targeted on the audience, with the formulation of tailored messages for clusters of stakeholders, and the use of proper communication means per stakeholder in accordance with the needs and evolution of the project.

The grounding of such a strategy was clearly defined and guided by D8.3 Dissemination, communication and exploitation plan. Nevertheless, Drones4Safety remains alert and open to the changes in the EC context (see the Corona virus spread) which directly impact on the project's work.

4 Communication and dissemination products

The above-mentioned dissemination strategy translates into a set of well-defined activities aiming at maximizing the project impact. These activities fall under two main categories:

1. Elaboration of communication and dissemination products, including tools and material implemented and used during the project life;
2. Participation in dissemination events, including conferences, workshops and seminars.

This section examines the communication and dissemination products elaborated.

4.1 Internal communication and dissemination

Internal communication and dissemination activities have the intent to coordinate the dissemination effort, keep consortium partners updated on the project progresses and facilitate the exchange of information between the partners. It covers the following activities:

- A Microsoft Teams shared workspace has been set up to share documents and schedule meetings.
- Internal mailing lists have been created including one company representative in order to exchange information.
- Graphic templates (Word and PowerPoint) and related guidance have been provided for internal utilization within the project consortium (see 4.2.2).
- A register is held to collect and share detailed information regarding scientific papers and internal and external events attended on behalf of Drones4Safety.
- A periodic email from WP8 DBL sends reminder emails to partners to ask for contributions and actions from them.
- A discussion of ongoing and future dissemination and communication activities is held during the Technical Steering Group Meeting every second Friday of the month.

4.2 Graphic identity

The project graphical identity is crucial for representing ideas and concepts involved in the project and making each act of communication immediately ascribed to Drones4Safety. The coherence of the communication is particularly relevant for external dissemination, as it builds and maintains a strong project image among the stakeholders. To this purpose, at the very beginning of the project Deep Blue has designed a dissemination pack for internal and external communication, containing the project logo and logotype with an associated pay-off and templates for deliverables and presentations.

4.2.1 Logo and logotype

The design and development of a logo able to give a conceptual representation of the project was a preliminary task of the dissemination programme. The intent was to create a logo graphically appealing, manageable and meaningful with respect to the project goals and activities. For this reason, Deep Blue involved all partners in the design process. At a first stage, Deep Blue asked them to fill in a co-design form (see Figure 1) with concepts and inspirational elements considered relevant and to be taken into consideration in the final logo. Concepts could be synthesized through a shortlist of keywords (maximum 5), while inspirational elements through a selection of images (maximum 3). Deep Blue asked also to motivate the choices.

DRONES4SAFETY

MOODBOARD for VISUAL IDENTITY DESIGN

-- We would like to co-design the visual identity of the project with you.

To this aim, we are asking you to kindly fill-in the following table with concepts and inspirational elements that you consider relevant and would like to be taken into consideration when shaping the project logo and visual identity.

Concepts can be synthesized through a shortlist of keywords (maximum 5 keywords), while inspirational elements can be shown through a selection of photographic images (maximum 3 images). Key words and inspirational images don't need to necessarily reflect one-another. To conclude, a brief motivation of the abovementioned choices can be added.

These elements will be the building blocks of a moodboard that we will be discussing during the next workshop meeting on Tuesday the 16th of June.

A moodboard is a visual communication tool that communicates concepts and visual ideas and serves as a starting point to focus one or different directions to define the project.

Thank you for your collaboration and time!
The Deep Blue team

| | |
|-------------------------|-------------------------------|
| Project Partner: | |
| Concepts/Keywords: | <i>Please list here</i> |
| Inspirational elements: | <i>Please copy-paste here</i> |
| | |
| Brief motivation: | <i>Please write here</i> |

Figur 1 Co-design form

From the formats received, Deep Blue selected the main key words and created a mood board which later was shared and discussed during the KoM. Finally, in accordance with ideas and concepts collected, Deep Blue created four initial proposals for the logo, each underlining a specific aspect of the project. Logo proposals were sent by mail to all partners and feedback was collected to further refine them. Taking into account these comments, Deep Blue produced the final logo as seen in the figures below.



Figur 2 D4S full logo



Figur 3 D4S plain logo



Figur 4 D4S icon

The key elements of the project and its conception are connoted by this logo. It shows a drone in pixel pattern in order to convey the idea of automation. In the background there is a line colored in safety yellow and representing the power line, so the energy harvesting. Finally, the curved lines can represent both a railway or a bridge, namely the infrastructures to be inspected. The main colors are the blue and the yellow safety, as presented in the boxes below. These colors have become the recognizable colors of Drones4Safety and have been used in the website and other dissemination materials.



#FED302



#426A9E

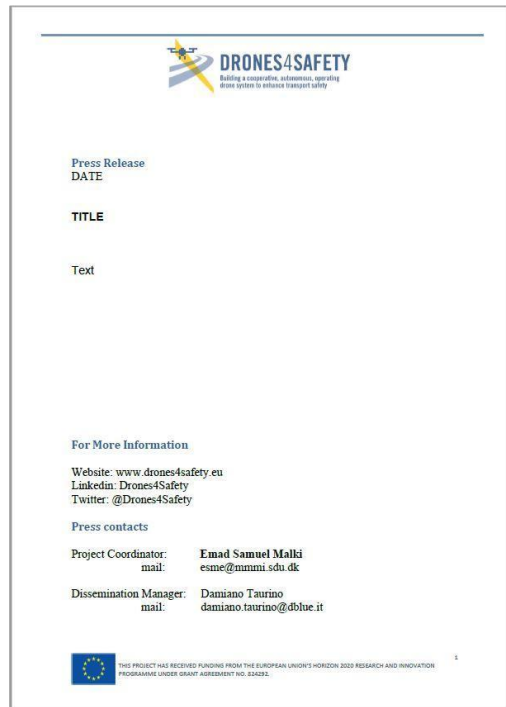
These strong and prominent metrics became the basis to develop the visual identity of the project. They have been intensively used in any communication activity and have created distinct brand awareness and attained project recognition from the very early stages of the project.

4.2.2 Document and presentation templates

Templates reinforce the consistency of the project visual language. Therefore, they have been set up and made available to all the partners to be used for presentations, deliverables and other documents for internal and external communication. They present the project logo and its recognizable colors. Three formats of templates are available:

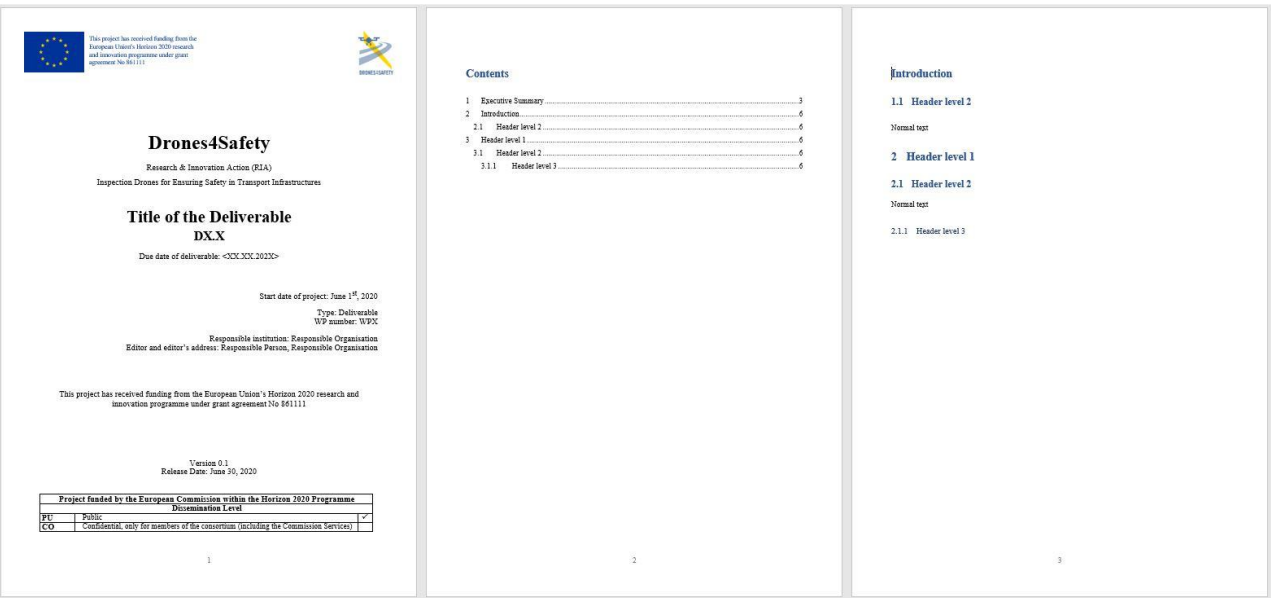
1. Word format for text documents and press releases (Figure 5);

2. Word format for deliverables (Figure 6);
3. PowerPoint format for presentations (Figure 7).



The image shows a Word template for documents. At the top, there is a logo for DRONES4SAFETY with the tagline "Building a cooperative, autonomous, operating drone system to enhance transport safety". Below the logo, there are sections for "Press Release", "DATE", "TITLE", and "Text". Further down, there is a section for "For More Information" with links to the website, LinkedIn, and Twitter. Below that, there is a section for "Press contacts" with details for the Project Coordinator (Emad Samuel Malki) and the Dissemination Manager (Damiano Taurino). At the bottom, there is a small logo for the European Union and a text box stating "THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT NO. 844292".

Figur 5 Word template for documents



The image shows three Word templates for deliverables. The first template on the left is a cover page for a deliverable. It features the DRONES4SAFETY logo and the tagline "Building a cooperative, autonomous, operating drone system to enhance transport safety". Below the logo, there is a section for "Drones4Safety" with the subtitle "Research & Innovation Action (RIA)" and "Inspection Drones for Ensuring Safety in Transport Infrastructures". The main title is "Title of the Deliverable DX.X". Below the title, there is a section for "Due date of deliverable: <XX.XX.XX>". Further down, there is a section for "Start date of project: June 1st, 2020" and "Type: Deliverable". Below that, there is a section for "Responsible institution: Responsible Organisation" and "Editor and editor's address: Responsible Person, Responsible Organisation". At the bottom, there is a section for "This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 844292". The second template in the middle is a table of contents. It lists the following sections: 1. Executive Summary (3), 2. Introduction (6), 2.1 Header level 2 (6), 3. Header level 1 (6), 3.1 Header level 2 (6), and 3.1.1 Header level 3 (6). The third template on the right is an introduction page. It features the DRONES4SAFETY logo and the tagline "Building a cooperative, autonomous, operating drone system to enhance transport safety". Below the logo, there is a section for "Introduction" with the subtitle "1.1 Header level 2". Below the subtitle, there is a section for "Normal text". Below that, there is a section for "2 Header level 1" with the subtitle "2.1 Header level 2". Below the subtitle, there is a section for "Normal text". Below that, there is a section for "2.1.1 Header level 3".

Figure 6 Word templates for deliverables



Figur 7 Power Point template

4.3 Project Website

The Drones4Safety official website (<https://drones4safety.eu/>) operates as the core digital means of communication and also as one of the principal publicity tools of the project. It grants to the project visibility and interaction at all levels: stakeholders, specialized audience, as well as general public.

The public website was created and launched before the kick-off meeting of the project. It is public and has been live since July 2020. The visitors can find information about the objectives, activities and results of the project. It also offers the possibility of downloading documents and reading news about Drones4Safety and its related topics. In addition, it integrates the Drones4Safety social networks profiles and links to the Consortium partners' websites. Therefore, it is regularly updated.

DBL is responsible for the graphical layout, the information architecture, and the implementation and maintenance of the website. Nevertheless, all partners contribute to the website by providing information, documents, or any other material that they consider useful to disseminate the progress of the project.

The website is organized in the following pages and sections:

1. Homepage: a scroll-down page introducing in a simple and immediate way the main project information: system, objectives, partners (with their logo linked to their website), relevant data (duration, budget, partners, member states), main, latest news and contacts (Project Coordinator and the Dissemination Manager email and link to the project social media). In the last section there is also a small and updated preview of the twitter profile.
2. Outcomes: a page divided into two sections:
 - Project deliverables: it shows the Drones4Safety work packages structure and the list of deliverables for each one, with the report of those one approved by the European Commission. The public approved deliverables are available for download.
 - Scientific papers: it shows the scientific papers with information regarding authors, language, publication status, journal or conference and link.

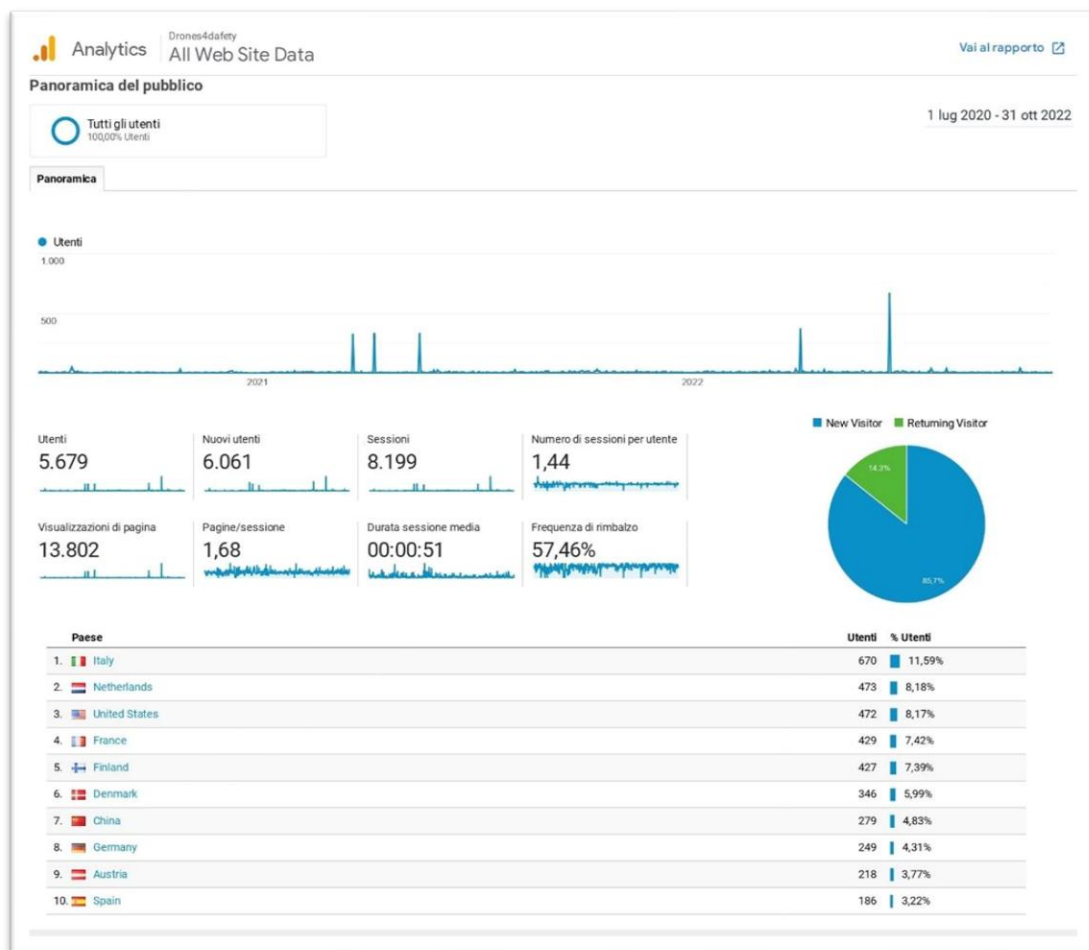
3. Advisory board page: listing the Advisory board members and their affiliation.
4. Page of the news: presenting the text of the news (article or press release) or information about the events related to the project (see 4.4). It includes a section for user comments.
5. Drones4safety media: displaying the project communication outputs including the concept view, the brochure, videos and posters.

Deep Blue used a Content Management System (CMS) platform for the development of the website, to ensure an easy management of both the graphical layout and its content. The chosen platform is WordPress (WordPress.org), a free, open-source CMS whose features include a plugin architecture and a template system. This makes the website easy to design, maintain and modify throughout the duration of the project. The website established itself as the first result when searching for the keywords “Drones4Safety”, which is the project’s tagline. It shows the recognizable style of the visual identity: a neutral color background with buttons and boxes respecting the project color palette in order to focus the visitor on the key concepts expressed.

4.3.1 Project website statistics

The project uses Google Analytics to monitor the quantitative and qualitative performance of the website. It shows in-depth details about the visitors (age, gender, interests and location), how long they stay, and all pages do they visit on the website. Through these data provided it is possible to shape and implement the communication strategies.

Data provided below cover the period spanning from 1st July 2020 to 31 October 2022.



Figur 8 Website statistics

For what concerns the audience, Figure 8 shows that the website is performing constant in terms of page views, pages/session, average session duration and bounce rate. The peaks of visit coincide with the days following the news publication. The session duration suggests that visitors do not stay long on the website. The novelty of the project may explain the initial interest towards the general aspects of the project website. Not surprisingly, the biggest number of visits (11,59%) comes from Italy, as three members of the Consortium (Deep Blue, Neat and EUCENTRE) are Italian. Likewise, France, Denmark and Germany also figure in the top-ten countries, thus reflecting the composition of the Consortium. In addition, many visits also come from the Netherlands (where the project attended a big forum) and from the United States and China (where the drone market is greatly growing up).

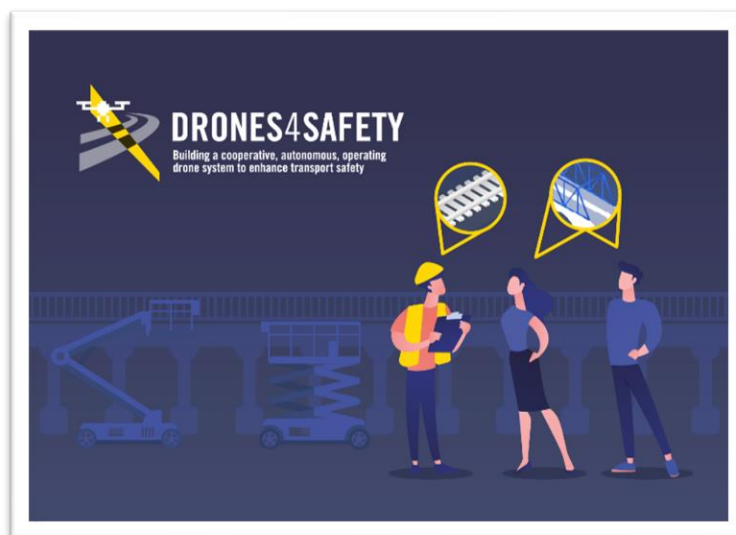
4.4 Blog

The Drones4Safety website hosts a blog (<https://drones4safety.eu/#news>) with posts and news related to the projects (events participation, issue of new deliverables, outcomes and achievements). All partners are involved in writing blog posts. An editorial plan complete with a publication calendar is in place to establish the partners responsible for producing the blog post each month.

DBL coordinates and supervises this activity to ensure consistency in quality and in the tone of voice of the communication.

4.5 Visual gallery

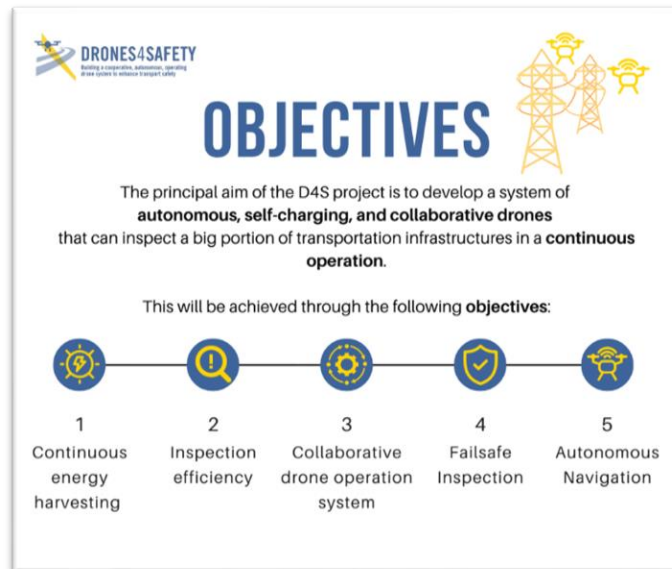
Drones4Safety holds a visual gallery of the project to ensure that the communication balances textual with coherent visual elements. The visual library is composed of images, photos and infographics related to the project in order to use them for communication actions. All partners are asked to increase this gallery. Figures below offer an example of these elements.



Figur 9 Visual gallery. Image



Figur 10 Visual gallery. Photo



Figur 11 Visual gallery. Infographic

4.6 Social media channel

Since June 2020, two communication channels have been set up, regularly updated, and intensively utilized up to now for maximizing the impact of the project activities, results and achievements.

These are Twitter and LinkedIn. The choice of these two channels is due to the following considerations:

- Twitter aims to speak to a specialized audience and to institutional bodies; it is also useful to promote active discussions among the general public. Furthermore, it is exploited when participating or hosting events to share frequent, short updates with the Drones4Safety followers.
- LinkedIn, being a professional social media network, reaches mostly a specialized audience of professionals and experts. In addition, it is useful to create an official group to build a strong professional network among strategic stakeholders.

Drones4Safety regularly uses a set of most relevant hashtags in order to promote itself and enter relevant, existing conversations on the selected social media, and most importantly to attract visitors to the Drones4Safety website. The following figure lists the main hashtags identified for each relevant topic:

| AUTOMATION OF INSPECTION | DRONE SYSTEM AND ITS PROPERTIES | INFRASTRUCTURES |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| #AI #ArtificialIntelligence #algorithm #Cloud | #drone #swarm #energy #harvesting #autonomous #cooperative #self-charging #efficiency #accuracy #system | #bridge #railway #powerline #transport #safety #inspection #detection #cables #faults #passengers #cargo |

Figur 12 D4S hashtags for topic

In order to maximize the impact of the project, on social media Drones4Safety has followed reliable and trusted entities and engaged with related projects (see D8.4).

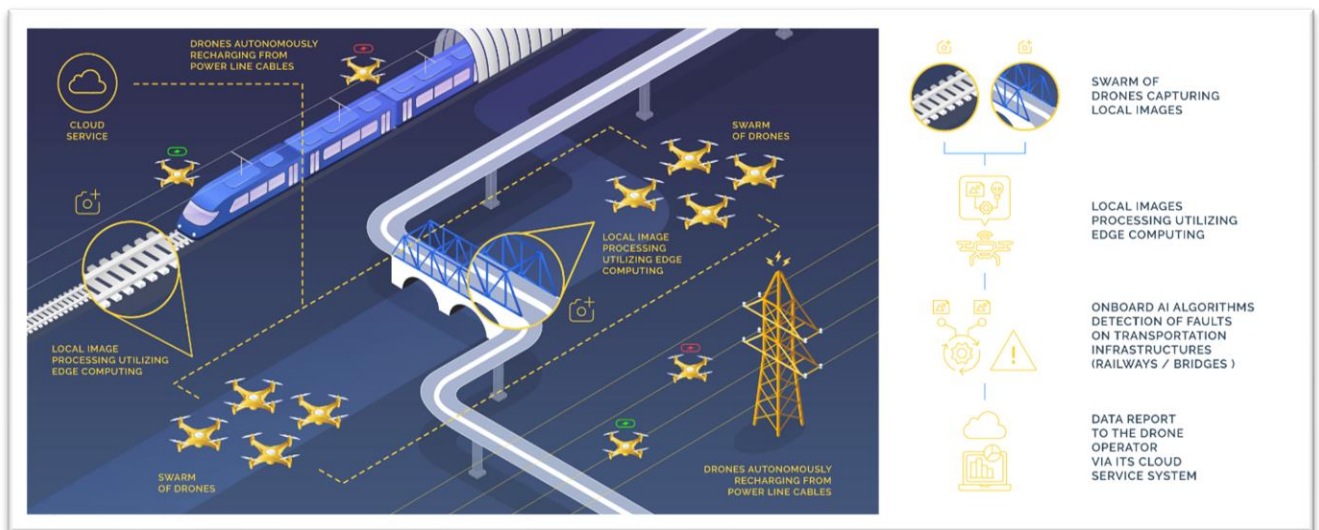
All the project partners have been engaged in social network dissemination activities by sharing news and posts and by collaborating to animate these profiles with content.

DBL works in conjunction with the partners to support their efforts, and to help ensure consistency in quality, message and in the tone of voice of the communication

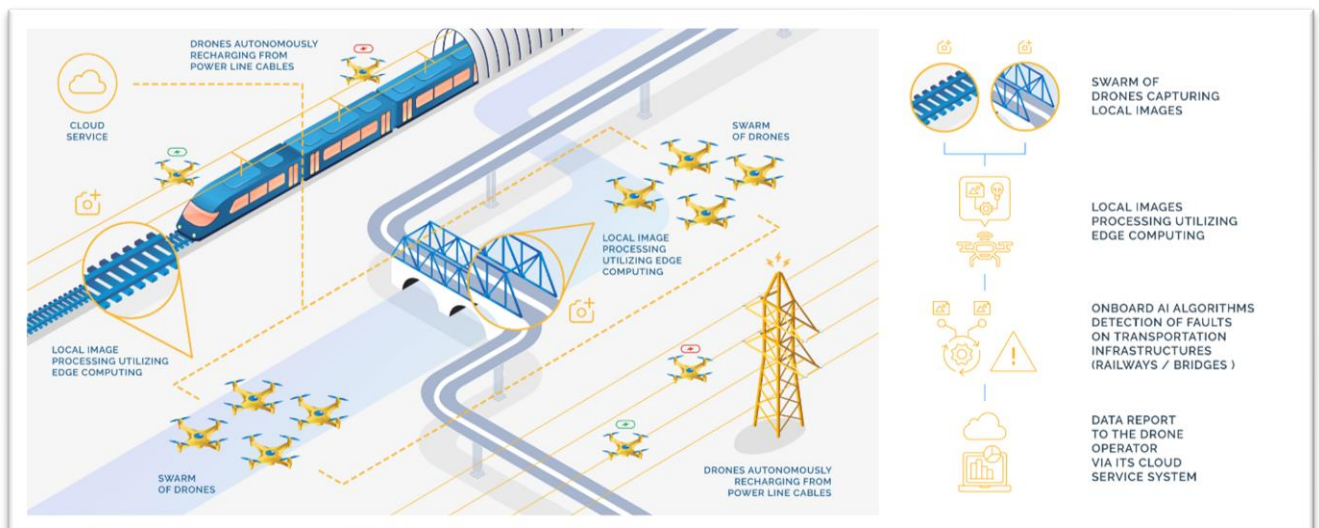
4.7 Graphic material

Promotional material has been designed and spread to reach different targets in a user-friendly, accessible, flexible and timeless way. The content and graphic materials are specifically defined depending on the purpose and phase of the project, with the approval of the consortium. They have in common a focus on the visual identity, with relatively short texts.

Figures below exhibit the concept image in dark and light versions:



Figur 13 D4S concept image- Dark version



Figur 14 D4S concept image - Light version

Figure below exhibits the Drones4Safety official poster:



BUILDING A COOPERATIVE, AUTONOMOUS, OPERATING DRONE SYSTEM TO ENHANCE TRANSPORT SAFETY

The aim of Drones4Safety (D4S) is to develop a system of autonomous, self-charging, and collaborative drones that can inspect a big portion of transportation infrastructures in a continuous operation.

OBJECTIVES:

- Drones harvesting energy from power or rail lines near the infrastructure to be inspected.
- Improving an AI algorithms to recognize faults on infrastructure components.
- Producing a safe operational system resisting harsh electromagnetic environments.
- Validating a collaborative and centralized drone system to inspect different sides of the infrastructure.
- Providing a system monitoring and controlling remotely the state and location of the drones.



Drones4Safety receives funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement 10.1017

Horizon 2020 project
Started in June 2020 - 36 months duration
Project Coordinator: Emad Samet, Malik Ebeid
es@esmm.science | University of Southern Denmark
Dissemination Manager: Damiano Taurino
damiano.taurino@deepblue.it | Deep Blue
Budget: 35 millions euros
www.drones4safety.eu

Figur 15 Drones4Safety official poster

Figures below display some of infographics published on the Drones4Safety social media:



Figur 16 Social Media graphic 1

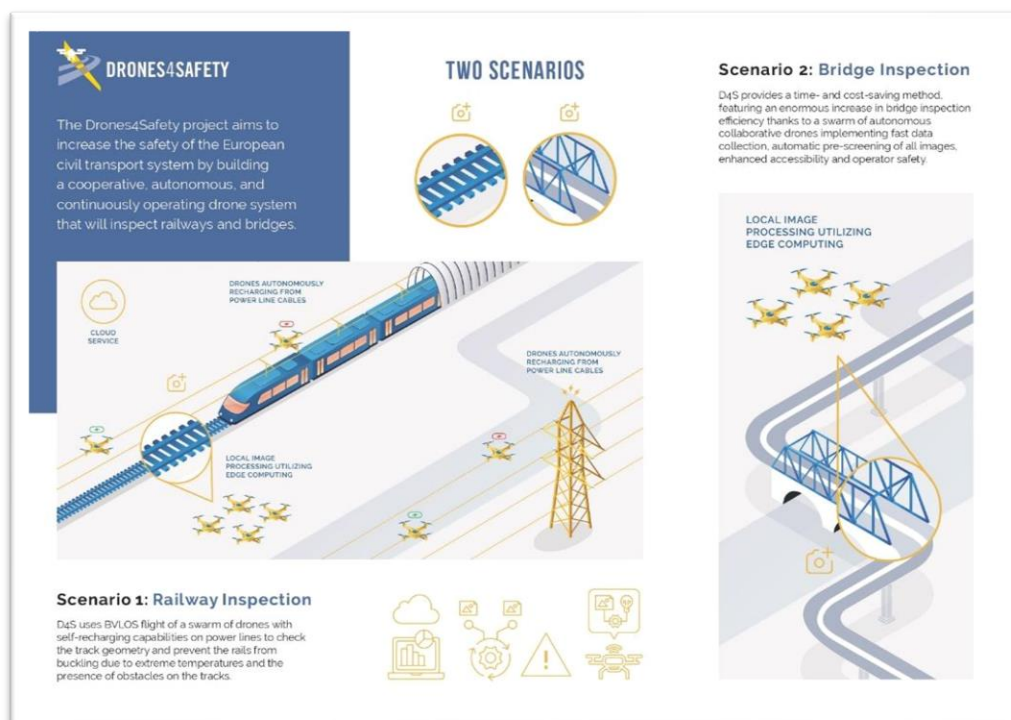


Figur 17 Social Media graphic 2

Figures below show the trifold brochure presenting the Drones4Safety project. It has been printed in n. 600 copies and distributed among partners in order to disseminate it in conferences and events.



Figur 18 D4S brochure. External side



Figur 19 D4S brochure. Internal side

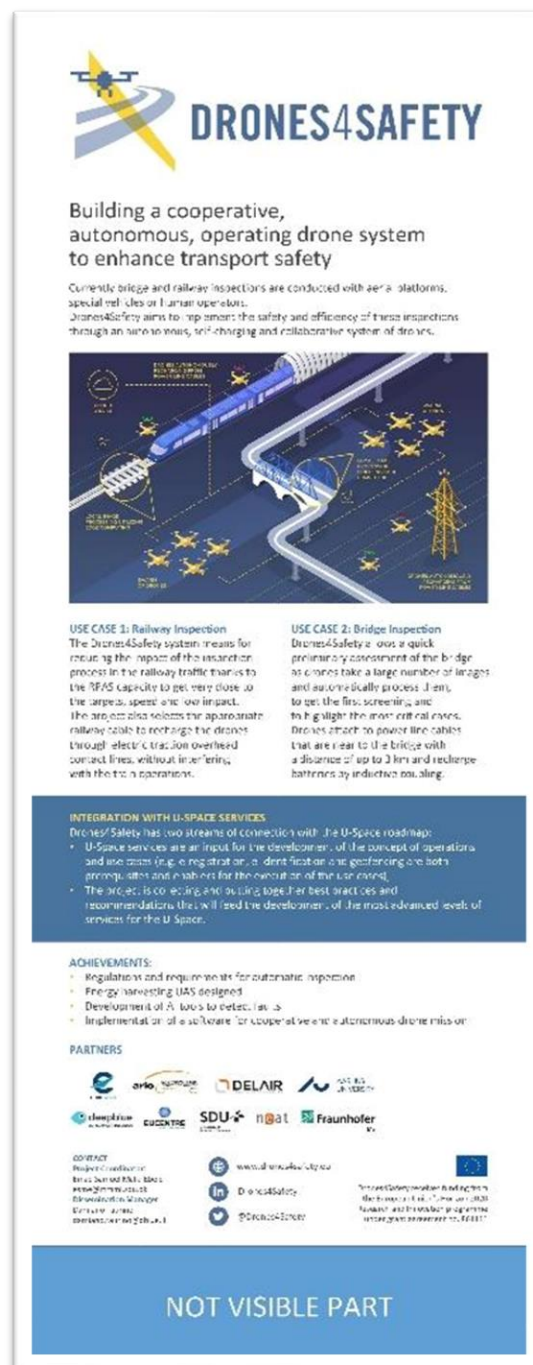
Digital and printable graphic material has also been produced to hold in person or virtual meetings and events. Due to the pandemic, the planned number of printed communication material has not been produced.

Figure below presents the poster for the European Drone Forum 2022:



Figur 20 D4S Poster for the European Drone Forum 2022

Figure below presents the poster for the Sesar Innovation Days 2022:



Figur 21 D4S poster for SID

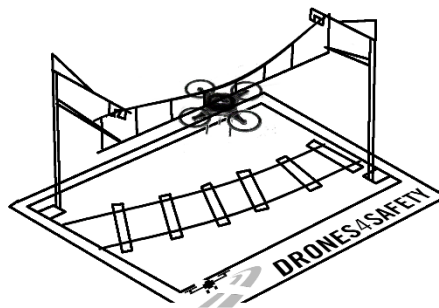
4.8 Gadgets

On the occasion of the European Robotics Forum 2022, taking place from 28th to 30th June 2022, the Drones4Safety has designed and realized two gadgets with the scope to maximise the project visibility. The drones4safety bag (Figure 22) displays the Drones4Safety concept view and a Qr-code linking directly to the official website. It has been conceived to collect the communication material (brochure and invitation to the Drones4Safety presentation speech) and deliver it to people visiting the project stand at the Forum.



Figur 22 Drones4Safety bag

The Drones4Safety 3d model (Figure 23) is a plastic representation of the Drones4safety system. It is possible to realize it with a 3d print starting from two cards provided in the Drones4Safety official website (Homepage, section “Drones4safety system”). The scope of the 3d model is to facilitate the understanding of the project system through a small-scale prototype and the interaction.



Figur 23 D4S 3d model

4.9 Presentations

Presentations have been prepared when participating in events, such as conferences and workshops, or for specific needs (for example invitation to Advisory Board, up-to-date internal meeting, etc.). The presentations have been adjusted to the specific event or audience. Their design makes the project easy to recognise.

4.10 Scientific papers

During the project all partners have produced peer-reviewed publications, review articles, and research papers for scientific magazines or events to deliver project results. Moreover, these papers help generate

understanding of the project activities and increase engagement with the stakeholders, especially with the specialized audience (such as political, scientific and medical communities).

The table below lists all the scientific papers and relevant information:

| Title | Involved Institute | Publisher | Category | Publication date | Status |
|-----------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------|---------------|-------------------|-----------|
| LOCATOR - Lightweight and Low-Cost Autonomous Drone System for Overhead Cable Detection and Soft Grasping | SDU | IEEE | Conference | 2020 | Published |
| Drones for Inspection of Overhead Power Lines with Recharge Function | SDU | IEEE | Conference | 2020 | Published |
| Survey and Evaluation of Sensors for Overhead Cable Detection using UAVs | SDU | ICUAS | Conference | May 2021 | Published |
| Radio Frequency Energy Harvesting | NiPS Laboratory | NiPS Laboratory | Summer School | 18 September 2021 | Published |
| MPDrone: FPGA-based Platform for Intelligent Real-time Autonomous Drone Operations | SDU | 2021 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR) | Symposium | October 2021 | Published |
| Novel Power Line Grasping Mechanism with Integrated Energy Harvester for UAV applications | SDU | 2021 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR) | Symposium | October 2021 | Published |
| Pneumatic-Mechanical Systems in UAVs: Autonomous Power Line Sensor Unit Deployment | SDU | IEEE | Conference | October 2021 | Published |
| A review on communication protocols for autonomous unmanned aerial vehicles for inspection application | AU | Elsevier Microprocessors and Microsystems | Journal | October 2021 | Published |
| On the Queuing Delay of Time-Varying Channels in Low Earth Orbit Satellite Constellations | AU | IEEE Access | Journal | 14 June 2021 | Published |
| Inspection Path Planning for Aerial Vehicles via Sampling-based Sequential Optimization | AU | ICUAS | Conference | 15-18 June 2021 | Published |
| Security Threats Analysis of the Unmanned Aerial Vehicle System | AU | IEEE MILCOM | Conference | 30 November 2021 | Published |

| | | | | | |
|---------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------|-----------|
| Use of UAS for damage inspection and assessment of bridge infrastructure | EUCENTRE | International Journal of Disaster Risk Reduction, Volume 72, 2022, 102824, ISSN 2212-4209 | Journal | February 2022 | Published |
| From Monolith to Microservices: Software Architecture for Autonomous UAV Infrastructure Inspection | SDU | Volume 12, Number 06, March 2022AIRCC Publishing Corporation | Journal and Conference | 26 March 2022 | |
| Multi-UAV Path Coordination through Generalized Potential Games | AU | ICARA | Conference | February 2022 | Published |
| High Precision Landmark based Positioning Algorithm for autonomous UAVs by using geofence and neutral network | ARIC | Navitec 2022 | Conference | 7 April 2022 | Accepted |
| Microservices for autonomous UAV inspection with UAV simulation as a service | SDU | Simulation Modelling Practice & Theory - special issue: Containerization, Microservices and Serverless Cloud Computing: Modeling and Simulation | Journal | 21 April 2022 | Published |
| Experimental Investigation of EMC Weaknesses in UAVs During Power-line Inspection Presentation format. | SDU | ICUAS: Conference on Unmanned Aircraft System | Conference | 21 June 2022 | Accepted |
| MPSoC4Drones: An Open Framework for ROS2, PX4, and FPGA Integration. | SDU | ICUAS: Conference on Unmanned Aircraft System | Conference | 21 June 2022 | Accepted |
| Onboard Powerline Perception System for UAVs Using mmWave Radar and FPGA-Accelerated Vision | SDU | IEEE Access (Volume: 10) | Journal | 26 October 2022 | Published |
| Dynamic landmark based RTK reference system for swarm of drones | ARIC | POSNAV 2022 Positioning and navigation for Intelligent transport systems | Conference | 3 – 4 November 2022 | Accepted |

The articles' references and, whenever possible, a copy of the publication is posted to the project website at this link: <https://drones4safety.eu/outcomes/>.

4.11 Videos

A video teaser was realized and addressed to the general public in order to raise awareness and provide information about the project with animations and a simple language. It was spread through the Drones4Safety website and social channels. It has also been uploaded to the Deep Blue YouTube channel to increase the number of views it receives. It is possible to see it at this link: https://www.youtube.com/watch?v=IQ_3EjYPCu8&t=13s.

4.12 Media Coverage

Tables below shows the media impact during the period M1-M30.

| Media | Date | Media Type | Description |
|----------------------------|---------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P4 Regionalenyheder | 13.06.2020 | Danish regional radio news | Nyt forskningsprojekt om droner, der skal hjælpe med at tjekke revner https://www.dr.dk/lyd/p4fyn (13 June 2020) |
| Radioavisen P1/P4 | 13.06.2020 kl. 9.00 | Danish national radio | Droner med kunstig intelligens skal selv tjekke revner i broer og jernbaner https://www.dr.dk/radio/p4/radioavisen/radioavisen-2020-06-14-09-00 |
| TV Avisen Morgen | 13.06.2020 | Danish national TV | Droner skal overvåge infrastruktur https://www.dr.dk/drtv/se/tv-avisen-morgen -afgoerende-forhandlinger-om-feriepenge_191668 |
| msn.com/da-dk | 14.06.2020 | International online news portal, danish pages | Kloge droner skal selv tjekke revner i broer og jernbaner https://finans.dk/tech/ECE12219631/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jernbaner |
| headtopics.com | 14.06.2020 | Online news portal | Kloge droner skal selv tjekke revner i broer og jernbaner https://headtopics.com/dk/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jernbaner-13659025 |
| nb-okonomi.dk | 14.06.2020 | Online magazine (economy sector press) | Kloge droner skal selv tjekke revner i broer og jernbaner https://www.nb-okonomi.dk/2020/06/14/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jernbaner/ |
| Sjællandske Nyheder, sn.dk | 14.06.2020 | Local Danish online newspaper | Droner skal selv vurdere revner i broer https://sn.dk/Erhverv/Droner-skal-selv-vurdere-revner-i-broer/artikel/1298371 |
| kristelig-dagblad.dk | 14.06.2020 | National Danish online newspaper | 14 Jun 2020, , Droner skal selv vurdere revner i broer https://www.kristeligt-dagblad.dk/erhverv/droner-skal-selv-vurdere-revner-i-broer |

| | | | |
|------------------------------|------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| herningfolkeblad.dk | 14.06.2020 | Local Danish online newspaper | Kloge droner skal selv tjekke revner i broer og jernbaner https://www.herningfolkeblad.dk/artikel/d819024a-ffca-3060-8db3-ee43c2ac3bff/ |
| Avisen.dk | 14.06.2020 | Danish online newspaper | Kloge droner skal selv tjekke revner i broer og jernbaner https://www.avisen.dk/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jern-603249.aspx |
| Jyske Vestkysten, jv.dk | 14.06.2020 | Local Danish newspaper | 14 Jun 2020 Kluge droner skal selv tjekke revner i broer og jernbaner https://jv.dk/artikel/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jernbaner |
| bt.dk | 14.06.2020 | National Danish online newspaper | Kloge droner skal selv tjekke revner i broer og jernbaner https://www.bt.dk/erhverv/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jernbaner |
| borsen.dk | 14.06.2020 | National Danish online newspaper | Kloge droner skal selv tjekke revner i broer og jernbaner https://borsen.dk/nyheder/generelt/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jernbaner1 |
| Finans.dk | 14.06.2020 | National Danish online newspaper | Kloge droner skal selv tjekke revner i broer og jernbaner https://finans.dk/tech/ECE12219631/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jernbaner/?ctxref=ext |
| berlingske.dk | 14.06.2020 | National Danish online newspaper | Kloge droner skal selv tjekke revner i broer og jernbaner https://www.berlingske.dk/business/kloge-droner-skal-selv-tjekke-revner-i-broer-og-jernbaner |
| Via/ritzau/ | 14.06.2020 | Press Agency | https://via.ritzau.dk/pressemeddelelse/new-eu-research-project-swarms-of-drones-to-ensure-safe-bridges-and-railways-across-europe?publisherId=12056383&releaseId=13595099 |
| Fyens Stiftstidende | 15.06.2020 | Print (Danish newspaper) | Droner skal forhindre brokollaps (print) |
| Unmanned airspace | 15.06.2020 | Online magazine (sector press) | https://www.unmannedairspace.info/latest-news-and-information/sesar-drones4safety-consortium-builds-swarm-drone-system-to-monitor-critical-infrastructure/ |
| Lolland-Falster Folketidende | 16.06.2020 | Print (Danish local newspaper) | Droner skal selv vurdere revner i broer (Print) |
| Reuters | 17.06.2020 | Video | Drones developed for better bridge safety, https://www.reuters.com/video/watch/idOVCIRLGFB |
| news.yahoo.com | 17.06.2020 | Online magazine | Drones developed for better bridge safety https://news.yahoo.com/drones-being-developed-better-bridge-172812327.html |
| Ingeniøren | 19.06.2020 | Online magazine (sector press) | Autonome droner skal finde slitage på Europas jernbaner og broer https://ing.dk/artikel/autonome-droner-skal-finde-slitage-paa-europas-jernbaner-broer-236407 |

| | | | |
|--------------------|------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Via/ritzau/ | 10.06.2022 | Press Agency | https://via.ritzau.dk/presmeddelelse/sdu-skriver-verdeshistorie-drone-lader-batteriet-direkte-pa-hojspaendingsledning?publisherId=12056383&releaseId=13653156 |
| Installator.dk | 14.06.2022 | Online magazine | https://installator.dk/drone-lader-batteriet-direkte-p%C3%A5-h%C3%B8jsp%C3%A6ndingsledning |
| Automatik & Proces | 10.06.2022 | Online magazine | Drone lader batteriet direkte på højspændingsledning |
| TekniskFOKUS | 15.06.2022 | Online magazine | https://www.tekniskfokus.dk/sdu-drone-lader-batteriet-direkte-paa-hoejspaendingsledning/ |
| Teknisk Nyt | 06.09.2022 | Print (Sector press) | Verdeshistorie: Drone lader batteriet direkte på højspændingsledning |
| EL+Energi | 22.11.2022 | Print (Sector press) | Droner kan nu oplades på højspændingsledningerne |

| Media | Date | Media Type | Description |
|---------------------|------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Via/ritzau/ | 14.06.2020 | Press Agency | https://via.ritzau.dk/presmeddelelse/new-eu-research-project-swarms-of-drones-to-ensure-safe-bridges-and-railways-across-europe?publisherId=12056383&releaseId=13595099 |
| Unmanned airspace | 15.06.2020 | Online magazine (sector press) | https://www.unmannedairspace.info/latest-news-and-information/sesar-drones4safety-consortium-builds-swarm-drone-system-to-monitor-critical-infrastructure/ |
| Urban Air Mobility | 19.06.2020 | Online magazine (sector press) | https://www.urbanairmobilitynews.com/inspection-and-surveillance/major-eu-project-led-by-sdu-announced-to-increase-transport-safety-by-using-drones/ |
| Scholars Hub Africa | 25.06.2020 | Online magazine | https://www.scholarshubafrika.com/56581/uea-copenhagen-joint-phd-scholarship-religion-social-change-africa-uk/ |
| Dronezine | 28.07.2020 | Online magazine (sector press) | https://www.dronezine.it/176353/ponti-e-ferrovie-controllate-da-uno-sciame-di-droni-ecco-il-progetto-drones4safety/ |
| Quadricottero News | 28.07.2020 | Online magazine (sector press) | https://www.quadricottero.com/2020/07/droni-in-sciame-per-la-manutenzione-di.html |
| Nuevo Periodico | 28.08.2020 | Online magazine | https://nuevoperiodico.com/mantenimiento-de-puentes-y-vias-ferreas-proximamente-se-podra-hacer-con-drones/ |
| droneItaly | 29.07.2020 | Online magazine | https://www.dronitaly.it/2020/07/drones4safety-sciami-di-droni-per-la-sicurezza-delle-infrastrutture/ |

| | | | |
|-----------------------------|------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | (sector press) | |
| 4mydrone | 29.07.2020 | Blog | https://4mydrone.com/it/droni-approfondimenti/droni-ispezione-manutenzione-drones4saftey/ |
| Close-up-Engineering | 31.07.2020 | Blog | https://buildingcue.it/drones4safety-monitorare-ponti-droni-italia-europa/21130/ |
| Edilportale | 28.08.2020 | Online magazine (sector press) | https://www.edilportale.com/news/2020/08/tecnologie/manutenzione-ponti-e-ferrovie-presto-si-potra-fare-con-i-droni_78120_12.html |
| Droneblog | 21.09.2020 | Blog | https://www.droneblog.com/2020/09/21/drones4safety-to-increase-safety-in-civil-transport/ |
| DroneXL | 23.09.2020 | Online magazine (sector press) | https://dronexl.co/2020/09/22/drones4safety-increase-safety-civil-transport/ |
| DroneExpos | 4.10.2020 | Blog | https://droneexpos.co.uk/increasing-safety-in-civil-transport-with-drones |
| Ekdeeps | 28.10.2020 | Online magazine | https://tekdeeps.com/maintenance-of-bridges-and-railways-soon-it-will-be-possible-to-do-with-drones/ |
| Kireti | 10.12.2020 | Blog | https://www.kireti.it/drones4safety-il-programma-europeo-che-utilizza-i-droni-per-la-sicurezza-dei-ponti/ |
| Impact Life Tech | 2020 | Blog | https://www.impactlifetech.com/study-in-denmark-2020-phd-scholarship-positions-on-autonomous-drone-navigation-and-grasping/ |
| Edilsocialnetwork | 2020 | Blog | https://www.edilsocialnetwork.it/notizie/urbanistica-lavori-pubblici/manutenzione-di-ponti-e-ferrovie-con-i-droni-il-progetto-drones4safety |
| Le strade dell'Informazione | 25.05.2021 | Online magazine (sector press) | https://www.lestradedellinformazione.it/rubriche/le-strade-della-sostenibilita/le-smart-road-nel-mondo-e-i-confronti-con-anas |
| TRIMIS | June 2021 | Blog | https://trimis.ec.europa.eu/sites/default/files/newsletters/trimis_newsletter_-_june_2021.html |

5 Dissemination events

Drones4Safety regularly attends or organizes events in order to promote the project and inform stakeholders of its status thanks to the support of oral or paper presentations. These events can fall under two categories: third-party events, and events organized by Drones4Safety. Due to the spread of the 2019 Corona virus disease (COVID-19), in the first year of the project circulation of people has been limited. Therefore, a lot of events have been held online with negative consequences on the number of participants (See chapter 7).

5.1 Third-party events and conferences

The table below shows the third-party events and conferences where the Drones4Safety project results have been presented.

| Event | Venue | Date | Institutions |
|--------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------|-------------------------------------------------------------------------------------|
| 2020 23rd Euromicro Symposium on Digital System Design | Online, Slovenia | 26.08.2020 / 28.08.2020 | University of Maribor |
| 2020 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR), | Online, United Arab Emirates | 04.11.2020 / 06.11.2020 | IEEE |
| ICUAS 2021 | Greece | May 2021 | Conference, Greece |
| IEEE International Conference on Robotics and Automation 2021 (ICRA) - | Xi'an (China) | 30.05.2021 / 05.06.2021 | |
| 11th EASN International Conference on “Innovation in Aviation & Space to the Satisfaction of the European Citizens”. | Online, Salerno | 2.09.2021 | EASN |
| NiPS – EnABLES Summer School “Powering the Internet of Things 2021” | Perugia | 15.09.2021 / 18.09.2021 | University of Perugia (Italy) and the EnABLES EU-funded project (grant no. 730957) |
| Trako Fair 2021 | Gdańsk | 19.09.2021 / 22.09.2021 | MTG SA Gdańsk International Fair Co. and the PKP Group |
| International Drone Show 2021 | Odense | 22.09.2021 | Odense Robotics and UAS Denmark International Test Center |
| Expo Ferroviaria 2021 | Milan | 28.09.2021 / 30.09.2021 | Mack-Brooks Exhibitions Limited |
| IROS 2021 | Online, Prague | 1.10.2021 | https://www.iros2021.org/committee |
| 2021 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR) | Online | 26.10.2021 | |
| "Use of drones for emergency support and damage inspection of bridge infrastructures" Webinar for the University of Costa Rica | Online, Costa Rica | 11.11.2021 | University of Costa Rica |
| PhD Students Webinar Series “Innovative applications of drones for ensuring Safety in transport” | Online | 23.11.2021 | Drones4Safety, Labyrinth and Rapid |

| | | | |
|--------------------------------------------------------------------------------------------|-----------------|-----------------|-----------------------------------------------------------|
| Drone Days 21 | Online | 26.11.2021 | Hub.brussels and enterprise europe network |
| IEEE MILCOM 2021 | San Diego (USA) | 30.11.2021 | Comsoc and AFCEA |
| Utilizzo Droni in ambito Protezione Civile | Online | 02.12.21 | EUCENTE and Regione Lombardia |
| KL Workshop - Teknologivurdering af Droner (KL Workshop – Technology Assessment of Drones) | Oral | 31.01.2022 | KL Kombit |
| European Robotics Forum 2022 | Rotterdam | 28 – 30.06.2022 | euRobotics |
| International Drone Show 2022 | Odense | 30.08.2022 | Odense Robotics and UAS Denmark International Test Center |

5.2 Events organized by Drones4Safety

Public events are directly organized by Drones4Safety to inform stakeholders about the progress and achievements of the project. During this type of events, the Consortium shares information with field experts and collects feedback from a qualified audience.

The table below provides a list of these events:

| Event | Venue | Date |
|--------------------------------------------------------------------------------------------------|-----------|-----------------|
| Drones4Safety kick-off meeting | Online | 15 – 16.06.2020 |
| First Drones4Safety Workshop | Online | 10 – 11.12.2020 |
| First Workshop with the Advisory Board | Online | 12.02.2021 |
| Drones4Safety biannual meeting 2021 | Rome | 14 - 15.10.2021 |
| PhD Students Webinar Series “Innovative applications of drones for ensuring Safety in transport” | Online | 23.11.2021 |
| Second Workshop with the Advisory Board | Online | 1.03.2022 |
| Drones4Safety biannual meeting 2022 | Rotterdam | 27 – 28.06.2022 |

6 Exploitation activities

6.1 Individual exploitation activities

In order to support and create synergies with exploitation activities, all partners work together but also conduct different exploitation activities, reported below.

6.1.1 SDU exploitation activities

SDU UAS has successfully designed and built an autonomous drone that identifies the powerlines and autonomously lands on them. The drone is shielded against a high electromagnetic field and equipped with cutting-edge technology for navigation and onboard processing. More than 10 scientific articles were written and published to present the research results.

In addition, the new research knowledge in autonomous systems and onboard processing is used in updating the teaching of Embedded Systems (Master's degree) and Hardware Programming (Bachelor's degree) classes. More than 100 students at the University of Southern Denmark are educated based on the achieved Drones4Safety results.

6.1.2 Aarhus exploitation activities

Exploitation activities at Aarhus University have been focusing on student project related to the Drones4Safety project.

Exploitation through PhD education:

- Liping Shi achieved his PhD in May 2022. The title of the thesis is: "Motion Planning for Autonomous Aerial Robots".

Exploitation through master's thesis student projects:

- 2022 Esben Haubro Skov and Asbjørn Lybker Christensen, "Riemannian Motion Policies Using Reinforcement Learning and Radio Link Quality for Efficient Multi-Drone Motion Planning", co-supervisor: Liping Shi, June 2022.
- 2022 Jakob Bonde Nielsen and Martin Videbæk Sepstrup, "Reinforcement learning based task allocation for collaborative agents", June 2022.
- 2022 Vinh Trung Thai and Mads Eeg Jørgensen: "Autonomous Swarm for Search and Rescue", June 2022.
- 2021 Martin Janosík, "Deep reinforcement learning for autonomous power line inspection using edge computing", January 2022.
- 2020 Mustafa Khaan Claasz Coockson, "Simulation of the boid model with path planning for autonomous drone swarms", Master's thesis, June 2020.
- 2020 Simon Anh Cao Nguyen, "Autonomous cooperative exploration for unmanned aerial vehicles", Master's thesis, June 2020.
- 2020 Antonio Mrzljak, "Localization of Pedestrians based on Fusion of Received Signal Strength and Inertial Sensors", Master's thesis, June 2020

Short R&D projects with students:

- 2022 Frederik Hasselholm Larsen, Group management in Ad Hoc Networks, Research & Development project, co-supervisor: Kaspar Hageman, June 2022.

6.1.3 Fraunhofer exploitation plan

Fraunhofer IMS expects the project to generate IP for energy harvesting. These IPs are needed for marketing by the project partners. Fraunhofer IMS would like to license this IP to the project partners. A corresponding

agreement is to be initiated after the project. There is no intention for exploitation by direct participation in the marketing of products resulting from the project.

The scientific work on this topic has been largely completed, with some results still emerging in the coming weeks. Three goals were pursued within the framework of the research project:

1. The energy yield for the AC harvester could be increased by about 15 %;
2. It was shown that the DC harvesting works well and a good potential to be used for the drone charging;
3. In these two areas, the scientific and technical development of the inspection sector could be jointly advanced and can be used for further developments.

With regard to scientific and economic connectivity, this is very interesting for the Fraunhofer IMS, as the application based on the use of drones promises significant savings compared to commercially used helicopter systems. The economic connectivity results from the range of services offered for product development. Fraunhofer IMS offers its industrial partners support for further product development steps. In addition to functional optimization, tasks for validation and qualification are also required.

The results expected by Fraunhofer IMS from the joint project can be transferred to other applications, such as the security monitoring of systems or buildings.

Fraunhofer IMS is involved in a follow-up project (Energy ECS), in which the charging of drones on buses is being realized.

6.1.4 Eucentre exploitation plan

EUC exploits the results of the D4S project in two main applied domains applied to civil infrastructure inspection for automated assessment and monitoring: 1. Bridge surveillance and planned maintenance, 2. Civil protection post disaster technical support. In both fields the expertise of EUC in damage assessment has a key role in transforming applied research into tested solutions in operational environment. In addition, the relevant expertise enhancement brought by the project allows EUC to further contribute to the undergraduate and postgraduate classes of University of Pavia and the University School for Advanced Studies of Pavia, within the framework of the trilateral agreement among the three institutions.

6.1.5 Aric exploitation plan

Most of the tasks at D4S project, like well-coordinated swarm flights, inspections flights and approaching power lines for re-charging, must be performed autonomously. Hence, high accurate and reliable position data must be available for each drone at every stage of the mission.

Therefore, ARIC developed a 3D high accurate positioning system as planned and originally described. The first set-up of the system was based on satellite navigations signals (GNSS, i.e. Galileo and GPS) combined with flight recorder signals being used in D4S project, like IMU sensor. The result was tested at ARIC's geodetic reference field REDUS.

Then, by adding a LiDAR-sensor, a landmark-based positioning concept and algorithm has been introduced and developed for D4S application. At SDU's site at Odense, where huge areas for outdoor and indoor testing of drones are available, the first test flights were carried by ARIC and SDU on 25. Nov. 2021 for obtaining LiDAR data. The core device being used for this purpose was a Robosense M1, a solid-state LiDAR inside an automotive-graded, robust housing.

Furthermore, based on this landmark-concept, a novel precise positioning system for an entire swarm of drones has been developed by combining the landmark positioning and RTK techniques for providing RTK-accuracy to all swarm members. Here, one drone dedicated for precise positioning gets its accurate position by detecting an precisely surveyed landmark in the area of the inspection target by its on-board camera and LiDAR sensor. Possible landmark candidates could be e.g. easily identifiable road or railway signs. Then the drone will constantly measure the 3D distance to the landmark. The known landmark's absolute geo-coordinates and the measured 3D distance are being used to correct the drone's position based on SatNav-signals and to calculate the deviation and its absolute position, i.e. its ground truth, very accurately. Finally,

this drone is acting as an RTK-base station that transmits the accurate ground truth value and the processed correction data to all other drones of the swarm.

Since real test flights are time-consuming and complex in preparation and execution, SDU's drone simulator based on QGroundcontrol and GAZEBO have been used at the early development and testing stages.

Both, the realized RTK correction system based on the landmark positioning concept and the models derived from the simulation are valuable cornerstones for enhancing ARIC's competencies and portfolio and can be applied for any upcoming vehicle application.

Currently, the work to extend the REDUS reference field for 3D applications is ongoing and the results will be available before the end of D4S-project. This will prove ARIC further competencies and methods in new test-, evaluation- and measurement techniques within a spatial 3D environment.

6.1.6 Deep Blue exploitation plan

DBL exploits the participation in the D4S project by enhancing its consultancy about Safety, Human Performance and Regulatory Compliance in the drone domain thanks to the analysis and support of innovative applications of drones in the Railways sector. Moreover, as a dissemination WP leader leads the communication and dissemination activities as described in this report.

6.1.7 Eurocontrol exploitation plan

Exploitation activities conducted by Eurocontrol are:

1. Consolidate European requirements and U-space Concept of Operations for a suitable eco-system of services and functionalities required to properly facilitate and support all the relevant BVLOS drone operations, including railway inspections: EUROCONTROL, supported by Deep Blue, has reviewed the U-space Concept of Operations developed in CORUS and subsequently assumed by both EASA and the SESAR JU as the U-space ConOps; we have also reviewed Commission Regulations for its implications for the D4S Concept of Operations and the planned Use Cases. Further the ConOps and the Use Cases have been reviewed in connection with the U-space services.
2. Ensure the safe integration of UAS at European level in the U-space ConOps while safeguarding the rights of all airspace users: The development of a U-space ConOps is not within the scope of Drones4Safety; the extended European U-space ConOps including Urban Air Mobility is presently ongoing in the S2020 VLD CORUS-XUAM. This activity is led by EUROCONTROL. Within the remit of D4S we have ensured that the D4S ConOps and use cases are aligned with the principles and assumptions of the present and future U-space ConOps, flight rules, airspace structure etc. so as to ensure safe integration of UAS in the existing airspace and U-space.
3. The findings have been documented in the deliverable D4S D8.5 "Recommendations for Standardisation and Policy Making".

7 Dissemination impact

The effectiveness of the dissemination actions is being evaluated along the whole project lifecycle through specific success indicators.

In fact, Drones4Safety has established Key Performance Indicators (KPI) in order to keep track of the dissemination progress, infer its success, and determine if the dissemination strategy is reaching the expected results.

The Drones4Safety project aims to influence policy strategies for the implementation of safety in transport of cargo and passengers. Therefore, the main measure of the Drones4Safety communication impact is the long-term adoption of the Drones4Safety system, and its approach. Other appropriated short-term metrics have been defined to assess the impact of the dissemination plan upon the different audiences. These are recorded regularly. The table below lists and describes in detail these metrics and their current status:

| Activity | Indicator | Target | Status | Means of monitoring | Corrective actions |
|------------|--------------------------------------------------|---------------------------------------------------|----------------|----------------------------------|--------------------------------------------------------------------|
| Website | N° of visits | 250 per month | 460 per months | Views of Google Analytics | / |
| | Search engine position | First page | ✓ | Google search | / |
| | Countries' visitors | 20 different countries | 19/20 | Google Analytics | - Media engagement - Reminders to promote dissemination actions |
| | N° of downloads | 10+ per document | ✓ | Wordpress | / |
| | N° of news | At least 2 per months | ✓ | Blog post + social media post | / |
| Materials | N° of brochures | 150+ printed brochures | 600 | Running total | / |
| | N° of dissemination reports | At least 2 per year | ✓ | Report presentation and document | / |
| | N° of technical handouts | At least 50 printed handouts distributed per year | 600 | Running total | / |
| | N° of posters | At least 3 | 3 | Running total | / |
| Activities | N° of third parties events attended | 10+ | 18 | Running total per event | / |
| | N° of D4S presentations at third parties' events | 10+ | 15 | Running total | / |
| | N° of contacts in the D4S mailing list | 80+ | 30 | Running total | Ask actions by every partner towards their networks |
| | N° of participants of | 50+ per event | 25 | | Due to the Corona Virus, it has not been |

| | | | | | |
|--|--------------------------------------|---------------|----|---------------|-----------------------------------------------------------------------------------------------------|
| | the D4S Workshops | | | Running total | possible to guarantee the number of participants required. |
| | N° of participants of the D4S events | 50+ per event | 25 | Running total | Due to the Corona Virus, it has not been possible to guarantee the number of participants required. |

8 Conclusions

The dissemination report presented in this document showcases the communication actions that the Drones4Safety project implemented to ensure circulation of information regarding the project. This report also updates the initial plan, based on the analysis of the activities performed until M30 and on new possibilities and constraints identified in the meantime, to provide further guidance on achieving the dissemination objectives.

Overall, the project reached and, in many cases, exceeded the KPIs selected at the beginning of the project: for example, with regards to the quantity and quality of visits to the website, the production of graphic materials, the events attended. However, this is not the case for some other KPIs: for example, the contacts collected in the mailing list and the number of participants at events. Wherever possible, activities have been delayed in order to be implemented in the last 6 months. For what concerns the events, due to the external cause (the spread of the Corona virus) the adjustment cannot be made on past events.

To conclude, it seems that the communication of the Drones4Safety progress and the dissemination of its results is in line with what can be expected based on the advancement of the project.