"5G for Drone-based Vertical Applications"

D5.1 – Communication, showcasing, dissemination, exploitation plan and standardization roadmap

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Approvals

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Executive Summary

The 5G!Drones project through the D5.1 presents and pinpoints the initial plans that will be applied related to WP5 activities of communication, dissemination, showcasing, exploitation and standardisation throughout the entire life-cycle of the project. The plans and strategies described will be constantly updated to formulate and reach maturity, while adapting to the project specifications and requirements for attaining the maximum impact. In addition it analyses in detail the core communication channels of the project such as website and social media. This deliverable is addressed towards technical and non technical audience, targeting the general public and interest. The exertion of presented activities targets at organizations, communities, industry, academia and research institutions.

D5.1 will strategically transmit to stakeholders the purpose of the document in a structured format by presenting the corresponding plan of each WP5 project activity. In specific, the communication plan emphasizes on the diverse digital and non-digital channels that will be used, the content that will be communicated and the overall strategy implemented for communicating the project to the broadest public with the maximum impact. The showcasing and dissemination activities will illustrate the means utilized depending on the nature of the dissemination events in order to appeal to the respective targeted audience with the highest impact. The project's exploitation plan in conjunction with the standardization roadmap and the cooperation with rest 5G-PPP projects will be applied throughout the partners' participation and their contributions to SDOs, 5G-PPP/5G-IA and the industry. The deliverable and its results will be intensively communicated to intensify the high quality and disruptive 5G!Drones technological awareness and achievements.

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List of Abbreviations

5G	5th Generation Cellular Technology
5G-IA	5G Infrastructure Association
5G-PPP	5G Infrastructure Public Private Partnership
ICT	Information and Communication Technologies
KPI	Key Performance Indicator
LTE	Long-Term Evolution
SDO	Standards Development Organization
UAV	Unmanned Aerial Vehicle
WG	Working Group
WP	Work Package

1. INTRODUCTION

1.1. Objectives of the document

The scope of D5.1 is to present and analyse the following initial plans and strategies of 5G!Drones project: communication plan, dissemination and showcasing plan, exploitation plan and standardization roadmap. All described activities are part of WP5 “Dissemination, standardisation and exploitation” and corresponding WP5 tasks of the project. Plans and strategies presented in this document will be applied throughout the entire life-cycle of the project and will be regularly updated/revised, if required, as per the needs of the project. Any future revision in plans, strategies and activities will be described in detailed in the upcoming WP5 related deliverables (D5.2-D5.6).

1.2. Structure of the document

The document is structured into 5 main sections as follows:

Section 1 introduces to the reader the purpose of this document, its structure and its target audience.

Section 2 presents the communication plan and strategy of 5G!Drones. Analysis is made on the communication channels used, with emphasis on website and social media channels, targeted audience, content used, strategy applied and control/monitoring tools used.

Section 3 presents the dissemination and showcasing plan and strategy of 5G!Drones. Focus is made on the means that will be used and the events that will be targeted by 5G!Drones partners for achieving the greatest impact and dissemination of project’s activities.

Section 4 presents the exploitation plan of all 5G!Drones partners and the standardization roadmap that will be applied through partner’s participation and contributions to SDOs as well as from their collaboration with the rest 5G-PPP projects through 5G-PPP/NetWorld2020 WGs.

Section 5 concludes this document.

1.3. Target Audience and Activity Phases

5G!Drones communication, dissemination, showcasing, exploitation and standardization plans and strategies are executed by all the partners and differ in regard to the nature of the partner as well as the means, content and target audience used. The industrial partners will approach industry sectors and their distributors as well as client networks, whereas the academic and research partners will target relevant research institutes and universities. Furthermore, an additional number of activities are targeted to organizations, communities, industry, academia and research institutions, as well as the general public.

Overall, the target audience of D5.1 is the following:

- **The broadest possible technical and non-technical audience:** This category covers the potential end users of 5G and drones’ products and services as well as the general public who is interested in these technological fields and advancements.
- **All 5G!Drones partners, collaborators and stakeholders:** This document is addressed to the entire 5G!Drones consortium and serves as initial documentation of the plans/strategies to be applied for efficiently performing communication and dissemination activities, demonstrations, partner specific exploitation and standardization activities and relevant collaborations (such as 5G-PPP, 5G-IA and Networld2020) in which 5G!Drones partners, and stakeholders are involved and/or affected.

Additional details on the targeted audience are given at the corresponding sections of each plan.

5G!Drones activities will also differ in intensity based on the time evolution of the project. In order to better monitor the intensity and set the corresponding goals per time period, the WP5 activities will be divided and carried out in two main phases:

- Phase 1: M1-M18.
- Phase 2: M19-M36.

The corresponding future deliverables (D5.2 at M18 and D5.5 at M36) will report in detail those achievements and will revise (if required) the corresponding plans.

2. COMMUNICATION PLAN AND STRATEGY

2.1. Introduction

The EU funded H2020 5G-PPP project 5G!Drones will focus in its early phases on the composition of a communication strategy, targeted towards specific market targets and stakeholders, while a communication assortment will be used as the core communication measure to promote the project. 5G!Drones will be communicated via the utilization of various means, channelled in a formal, high quality and engaging format including a combination of both digital and physical channels. In this context, the methodologies adopted in coalition with the data, purpose and project accomplishments are to be publicized. This approach will actualize the added value, technological, academic and social contributions derived from the project activities and findings extending the project's calibre beyond the organizations, research and academic institutions that comprise the consortium itself.

A sequence of core communication activities will focus on transferring both explicit and tacit knowledge, technical and non-technical. These communications will illustrate the project's scientific and technological findings in synchronization with future recommendations and are to be discerned throughout the project lifecycle via multiple high-impact channels such as the 5G!Drones website, social media accounts (Twitter, LinkedIn, Facebook, Instagram), videos (5G!Drones YouTube channel), newsletters, posters, leaflets and press releases. Substantially the foundation of the communication activities will concentrate on raising the project's distinct (brand) awareness and its overall promotion via physical and digital means with the implementation of interactive activities or simply informative releases. Such activities are to be conducted, transferred and commonly updated within the frame of the 5G!Drones project's website and the different social media channels, in combination with the composition of physical communicative mediums including newsletters, leaflets, flyers, and press releases.

The project use cases will focus on the 5G technology in correlation to drone characteristics and their results will be intensively communicated among the broadest targeted audience. The communication activities will enact as a guideline and roadmap for potential users and stakeholders such as academics, researchers, organizations, industrial communities and others. The bilateral axes that have been identified in the 5G!Drones communication action plan include:

- The means and channels to be utilized for communication purposes in order to reach specific target groups
- Addressed audiences/clusters and content type communicated through those channels

2.1.1. Purpose and Objectives

The criticality of communications and its embedded activities within the project frame are considered of uttermost importance for the successful circulation of news. This will further enhance the intensification of relegating awareness with a focus to captivate a wider pool including potential supporters, perspective clients, end users, verticals and other industries.

The main objectives that will be fulfilled by the 5G!Drones communication plan and actions are:

- To communicate project activities, findings and recommendations
- To raise awareness of the project to relevant industries and stakeholders
- To foster inter-communication with other research projects
- To communicate project innovations to the broader public and society
- To attain high project visibility and increased awareness to the broadest audience
- To raise 5G!Drones impact on the general public/society

2.1.2. Target Audience

In a detailed approach the heterogeneous target groups and audience addressed by the 5G!Drones communication plan include:

- **Technical & Non-technical audience**: In a broad sense the whole society – referring also as the general public. This group represents potential end-users and the actual drones and 5G products and services from a consumer perspective for the years to come.
- **The Industry:** All clusters that acquire an industrial professional background with high technical knowledge and specialization in the field, which may be working in relevant areas of 5G and drones such as:
    - Technology Producers, Suppliers, Carriers, Vendors
    - SME's (e.g. application developers and third-party providers of 5G related services).
- **Academia and Research Institutions:** Institutions (consultancies) from the ICT sector, higher education institutions (universities and educational centres, including those for lifelong learning, i.e. vocational training, re-training of experts in new technologies and multimedia services and applications), as well as national, public and private research institutes.
- **Public and Private Service Providers:** Current providers of 4G/5G services, network operators, verticals, and other relevant institutions that will upgrade to a 5G network system in the near future, along with drone companies/providers (e.g. ANSPs).
- **Standards Developing Organizations (SDO):** SDOs with the goal to support standardization conditions of the relevant 5G!Drones project results, thus supporting the interoperability and implementation of the technologies to optimize project results and further contribute in future-proof technology developments.
- **Regulatory bodies:** National authorities and national legislation bodies, which deal with topics relevant to 5G!Drones, e.g. drones regulatory framework ,5G bands and spectrum management etc.

Targeted segments will be approached by the project's communication activities via the distinctive communication/digital media channels described below and further analysed in Section 2.3:

- 5G!Drones logo
- 5G!Drones website
- Social media channels
    - 5G!Drones Twitter channel
    - 5G!Drones LinkedIn channel
    - 5G!Drones Facebook channel
    - 5G!Drones Instagram channel
    - 5G!Drones YouTube channel
- Quarterly newsletters
- Leaflets
- Banners
- Press releases
- Videos (presentations, interviews, tutorials etc.)

- Communication of 5G!Drones news to EC, 5G PPP, 5G-IA and NetWorld2020 communication channels (social media channels, newsletters, newsflash)

The table below is an indicative depiction of the representative audiences, channels/activities and timelines that are to be applied:

Table 1: Targeted Audience, Activities and Timing

Audience	Activity	Timing
All - Technical & Non-technical audience (General public)	**Project website** 5G!Drones will share its concepts, results and achievements through its dedicated project website. The website will be the major tool of communication and promotion of the project.	M1 and continuous update
All - Technical & Non-technical audience (General public)	**Communication via social media** 5G!Drones project will continuously communicate via its social media channels its activities and achievements. In addition, we will take the opportunity to reshare our activities through 5GPPP communication tools, like 5GPPP website, social media, newsletter and newsflash.	M1 and continuous update
Industry, Academia and Research Institutions, Technical & Non-technical audience (General public), Public and Private Service Providers, Standards Developing Organizations (SDOs)	**Newsletters, Posters, Leaflets and Press releases** 5G!Drones will prepare and distribute project poster, press releases and leaflets to raise public awareness on 5G!Drones technologies, i.e. 5G and UAV in various communication and disseminations events that 5G!Drones will get involved	M3 and event-driven
Industry, Academia and Research Institutions, Technical & Non-technical audience (General public), Public and Private Service Providers, Standards Developing Organizations (SDOs)	**Videos** 5G!Drones will create public videos to explain the use cases and achievements of the project as well as its impact on the society. Videos might be also focused on interviews and tutorials.	Event-driven
Industry, Academia and Research Institutions, Technical audience, Public and Private Service Providers, Standards Developing Organizations	**5G!Drones partners and Communities** 5G!Drones partners involved in various communities at national and international level (e.g. EC, 5Global initiatives, 5GPPP & 5G-IA, UAVS association) will promote the project concept and use cases through these	Event-driven

(SDO)	communities and through their institutions/companies	
Academia and Research Institutions, Industry, Public and Private sector	Academic and research partners will use the concepts developed in the project to create new contents regarding UAV business and market areas and their applicability in a 5G environment. Communication and dissemination communities will be combined for achieving the maximum project impact in various events	Event-driven

2.2. Content Differentiation, Targeting and Strategy

Each identified targeted audience of 5G!Drones will receive the content that is suitable to its interests, knowledge and needs. In fact, 5G!Drones communication activities will not only be differentiated based on the content type, but will also differ in intensity. This intensity is to be derived from the evolution phases of the project (activities, achievements and results) along with the communication channels used. All communication activities will be carried out continuously, spanning throughout the project's duration with increasing levels of intensity starting from the creation of general awareness (general type of content), continuing with technical specifications, achievements and results, and concluding with attracting potential supporters, customers and users (industries and verticals) based on the communication of final project results.

The core objective of all 5G!Drones communication activities is to attain high project visibility and increased awareness to the broadest audience by targeting the appropriate content to the proper audience via the most suitable channels.

As per 5G!Drones communication strategy, specific course of actions have been defined and will be followed throughout the project lifetime:

- All communication channels are continuously used and updated on a regular basis
- The project's web site will be constantly updated with news and fresh content
- Social media posts are made on a regular basis (a minimum weekly average of 2 posts)
- Higher frequency of posts during events, meetings, conferences etc.
- During the first four months of the project (M1-M4) an intensive communication of the project was applied targeting at wider audience (based on versatile content related to the project, 5G and drones related topics), for accumulating more visitors/followers
- Starting from September (M4), a special series of posts #LearnAbout5GDRONES, focused on highlighting exclusive project news and achievements, was successfully introduced to all 5G!Drones social media channels
- Different strategy on posts/content used per communication channel for addressing the appropriate audience (audience/followers are differentiated from channel to channel)
    - Website: Technical and non-technical content targeting the broadest audience

- LinkedIn/Twitter: More technical and project focused posts aiming at technical and scientific audience
- Facebook/Instagram: Non-technical audience - Posts on 5G/Drones topics of general interest and communication of all 5G!DRONES dissemination and showcasing activities
- YouTube: Addressing the general audience (technical and non-technical) with videos focused on presentations, conferences, events, tutorials, interviews etc. These posts are event-driven

- Continuously promoting 5G!Drones through 5G-PPP and NetWorld2020 websites, social media channels, newsletters etc.

The proposed communication strategy will be constantly monitored, using the monitoring/control processes and tools described in Section 2.4, and will be updated/revised regularly, whenever new needs arise or spotted by the monitoring mechanisms, throughout the lifetime of the project.

2.3. Channels of Communication

2.3.1. 5G!Drones Logo

The 5G!Drones visual identity was created at the very beginning of the project and provided a clear identity and appearance. The logo creatively integrates an image of a drone within its frame accommodated with the keyword 5G. This logo connotates the key elements of the project and its conception. These robust and notable indicators intelligently convey to the audience the project's overall concept. The logo was released in two versions which include a regular white background version and a transparent one.

Figure 1: 5G!Drones logo

2.3.2. 5G!Drones Website

The 5G!Drones project has established its official website available at www.5gdrones.eu**,** serving as a portal where informative details and relevant 5G and drone data are published, sustaining the ICT-19 project's scope across multiple vertical industries. The 5G!Drones website was developed before the project's initiation and launched at the beginning of May 2019.

In specific, 5G!Drones website is:

- Developed in WordPress
- Google Analytics enabled
- reCAPTCHA v3 protected
- Multiple menu options are available for covering all types of project's activities
- Contact form (addressing project coordinator) available

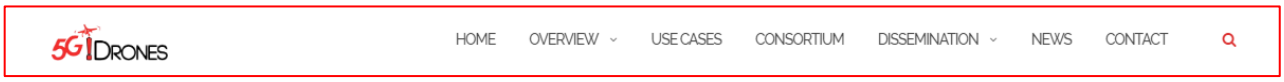

Figure 2: 5G!Drones website Menu

The website is divided into seven menu sections including: Home, Overview, Use Cases, Consortium, Dissemination, News and Contact.

- **Home:** This is the main page of the website, which provides information regarding the project, its partners and options that trigger the attention of the end user prompting them to scrutinize and learn more about 5G!Drones. The homepage hosts several sections that easily navigate the visitors to the rest pages of the website for additional information (Figure 3).

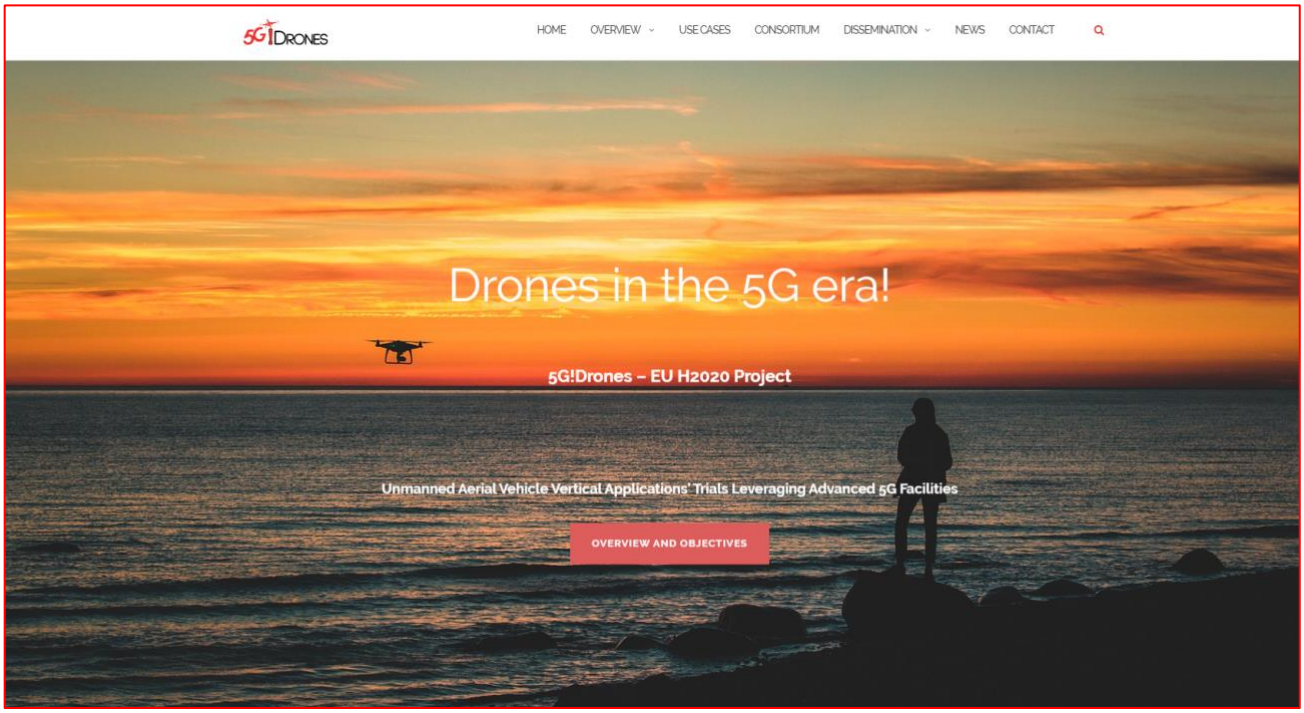

Figure 3: 5G!Drones website: Homepage

- **Overview:** The specific page incorporates an overview of the project and its trial locations. Moreover, it is divided in two subsections which include the Objectives and Collaboration with the 5G facilities, which provide additional critical information that focus on the project's overall objective and its architecture respectively (Figure 4).

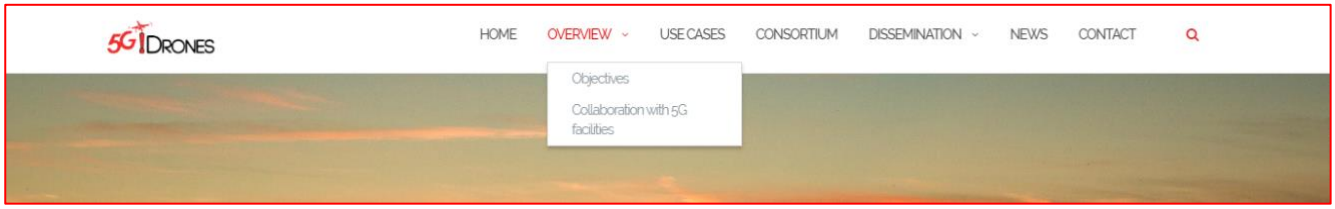

Figure 4: 5G!Drones website: Overview Menu

Figure 5 depicts the “Overview” page where an overview of the project and its trial locations are presented.

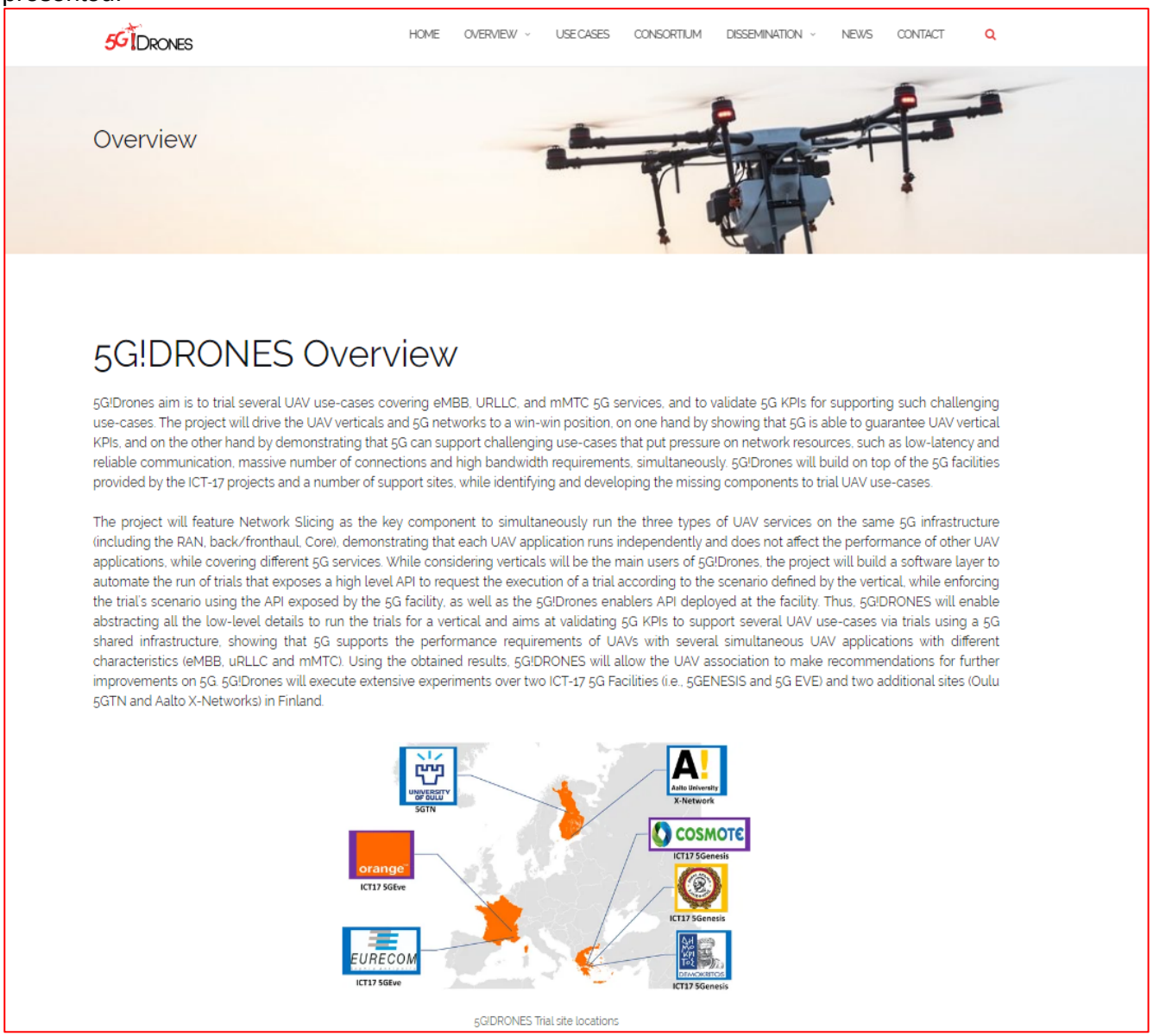

Figure 5: 5G!Drones website: Overview Page

As already mentioned, the “Overview” Page is divided in two subsections including the Objectives and Collaboration with the 5G facilities. The “Objectives” Page (Figure 6) provides an analysis of the objectives and their respective descriptions.

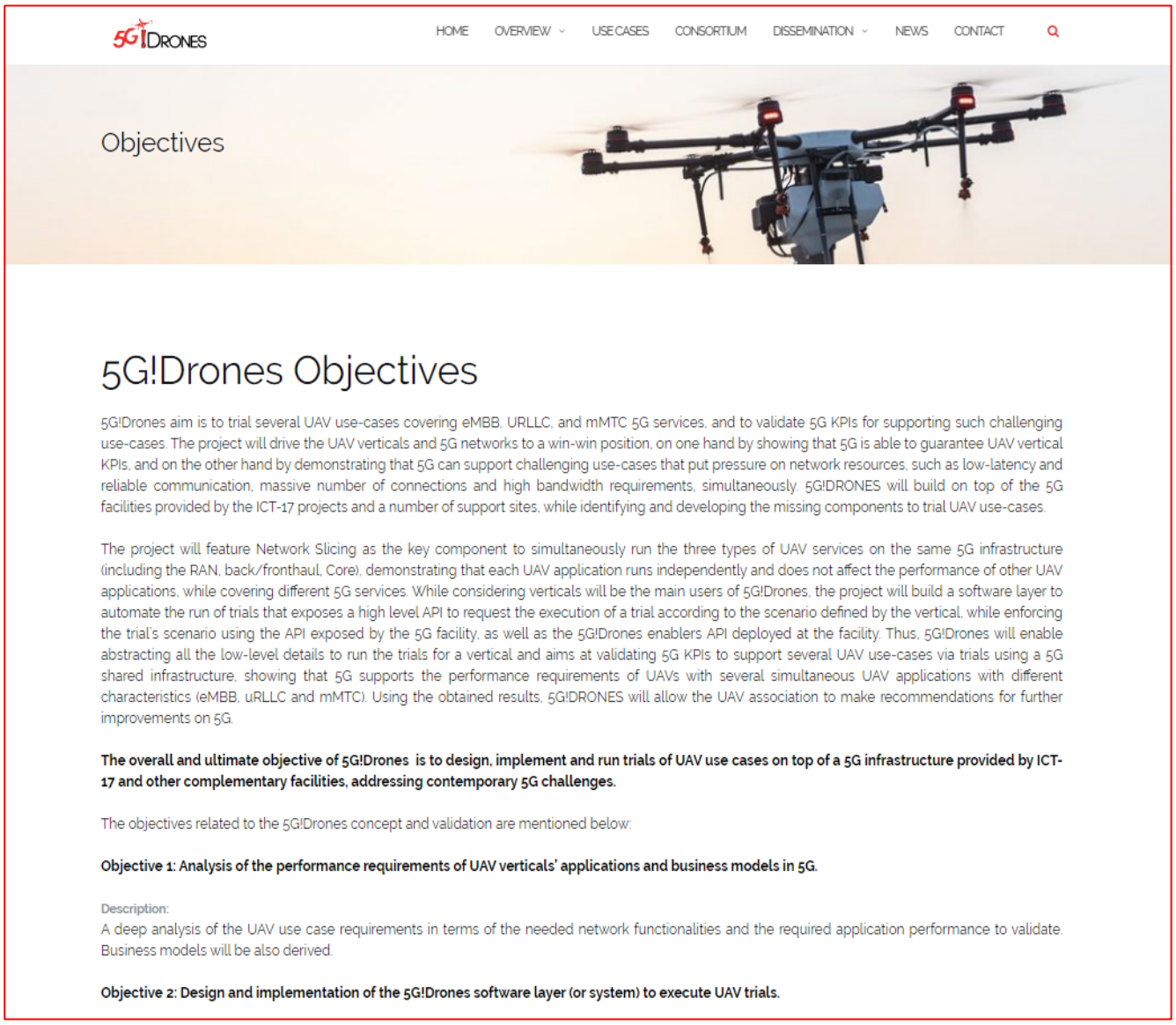

Figure 6: 5G!Drones website: 5G!Drones Objectives Page

The second subsection of the “Overview” page is entitled “Collaboration with 5G facilities” and provides an analysis of the 5G!Drones architecture and the corresponding 5G facilities (Figure 7).

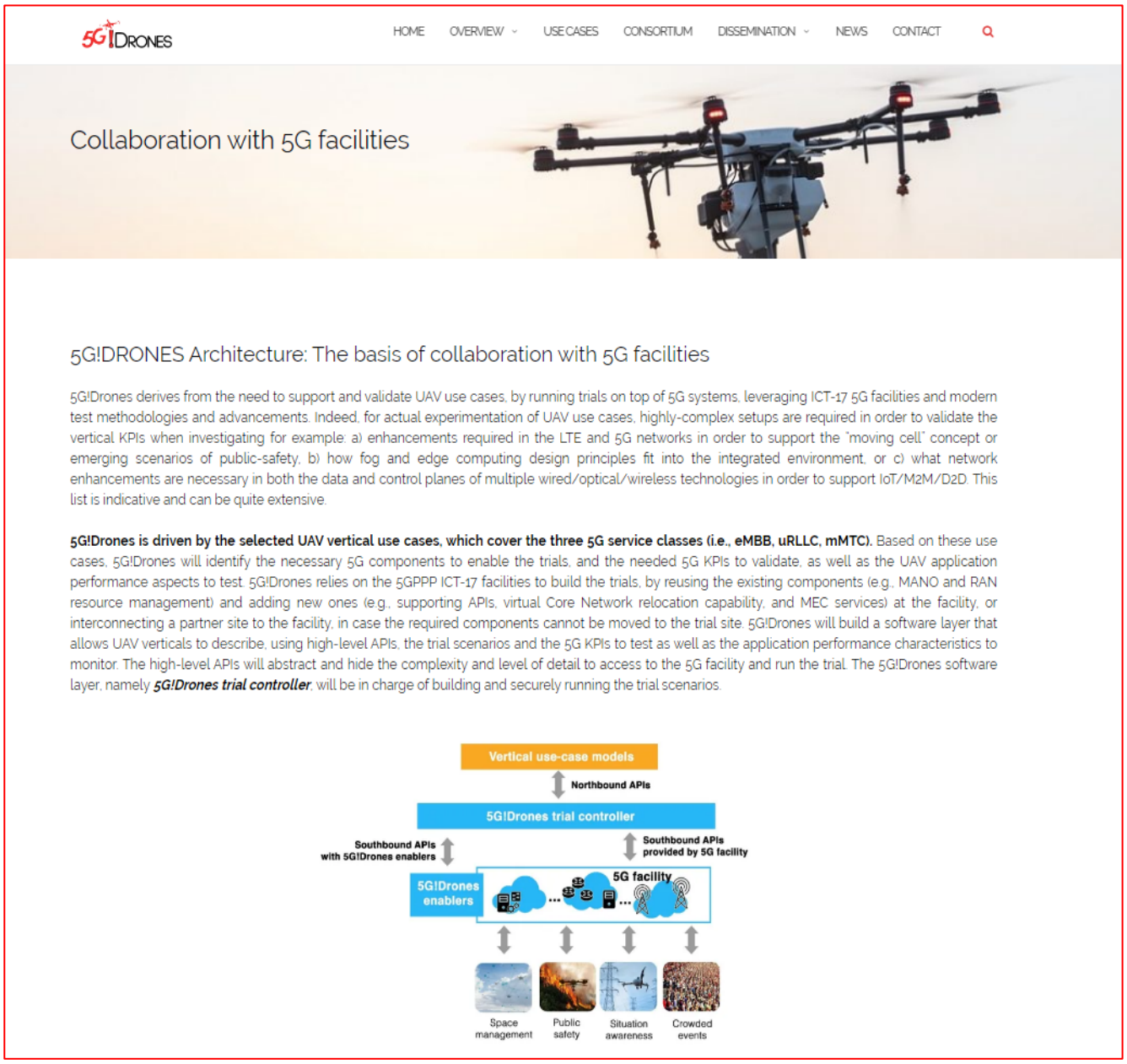

Figure 7: 5G!Drones website: 5G!Drones Collaboration with 5G facilities Page

- **Use Cases:** This page provides a description of the 5G!Drones use cases along with their respective use case representations (Figure 8).

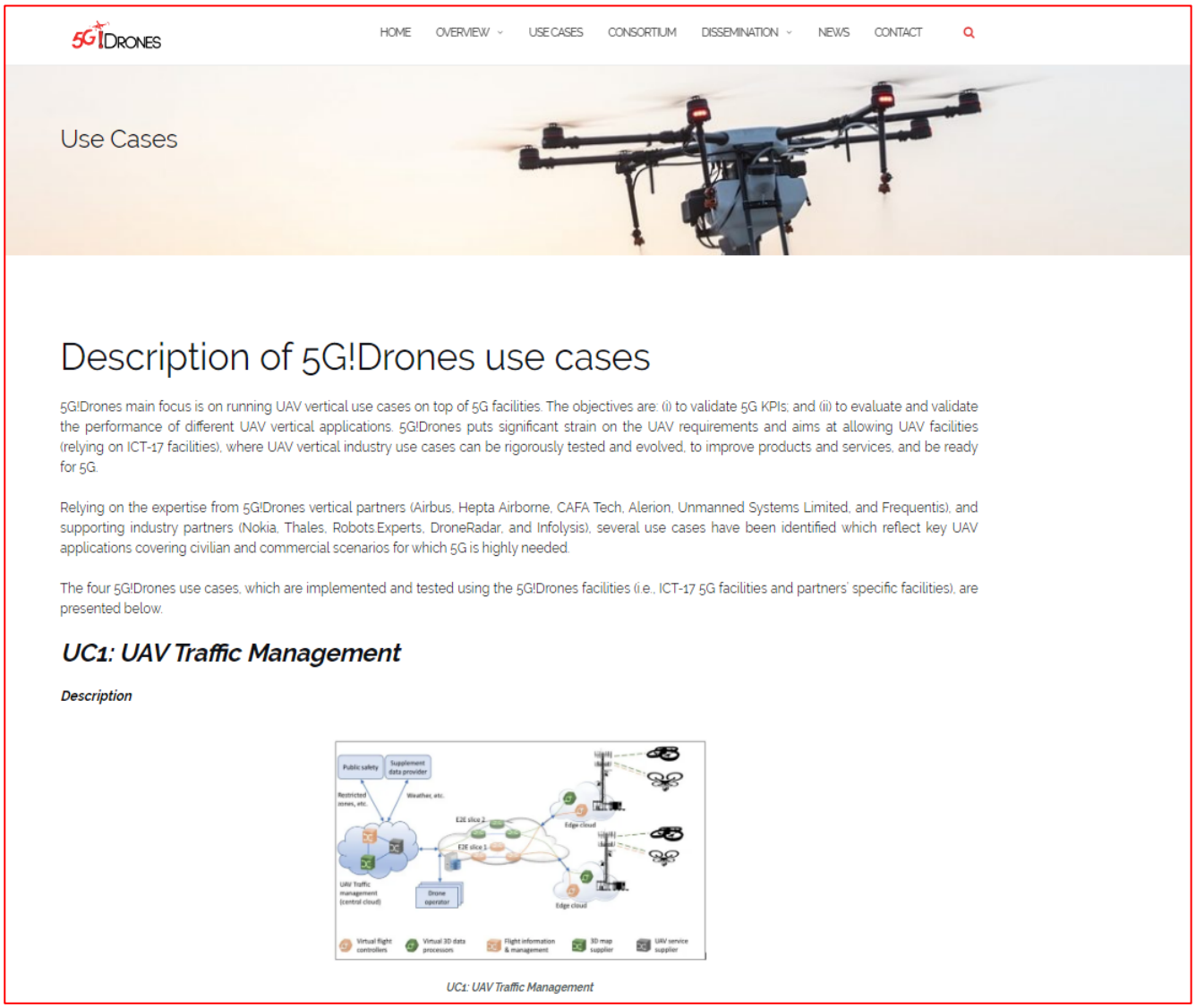

Figure 8: 5G!Drones website: 5G!Drones Use cases Page

- **Consortium:** The 5G!Drones consortium/partners are proudly presented within the specific page along with their corresponding country of their origin (Figure 9). Each partner's name is actually an active hyperlink leading the visitors to the partners' webpage when clicked.

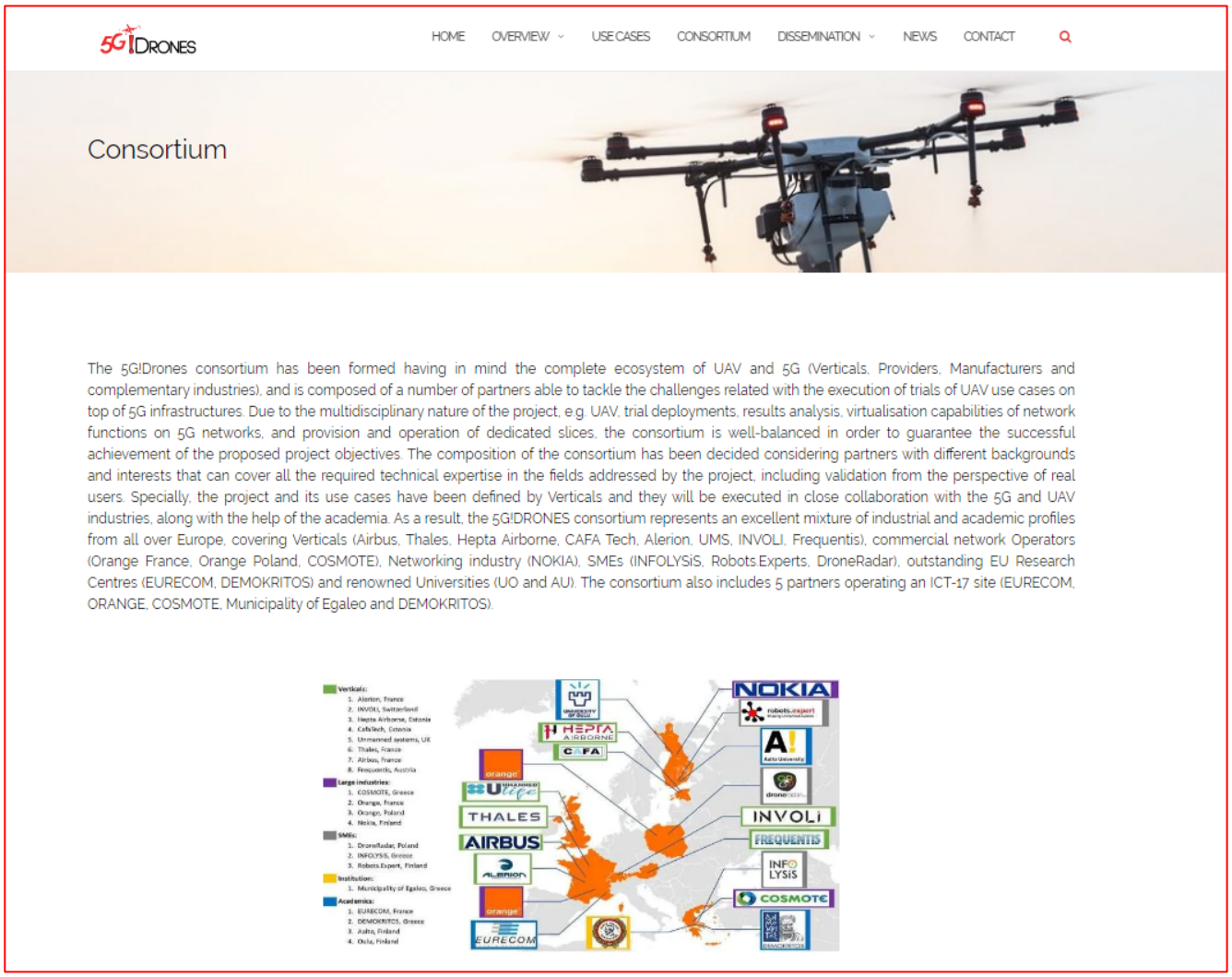

Figure 9: 5G!Drones website: 5G!Drones Consortium Page

- **Dissemination:** This page provides a detailed overview of the dissemination activities that have been performed by the project partners. In specific, it is divided in seven subsections (Figure 10). These include publications, workshops, presentations, articles, press releases, deliverables, newsletters and events. The “Events” page is divided in two subsections, which provide information on the upcoming and past events

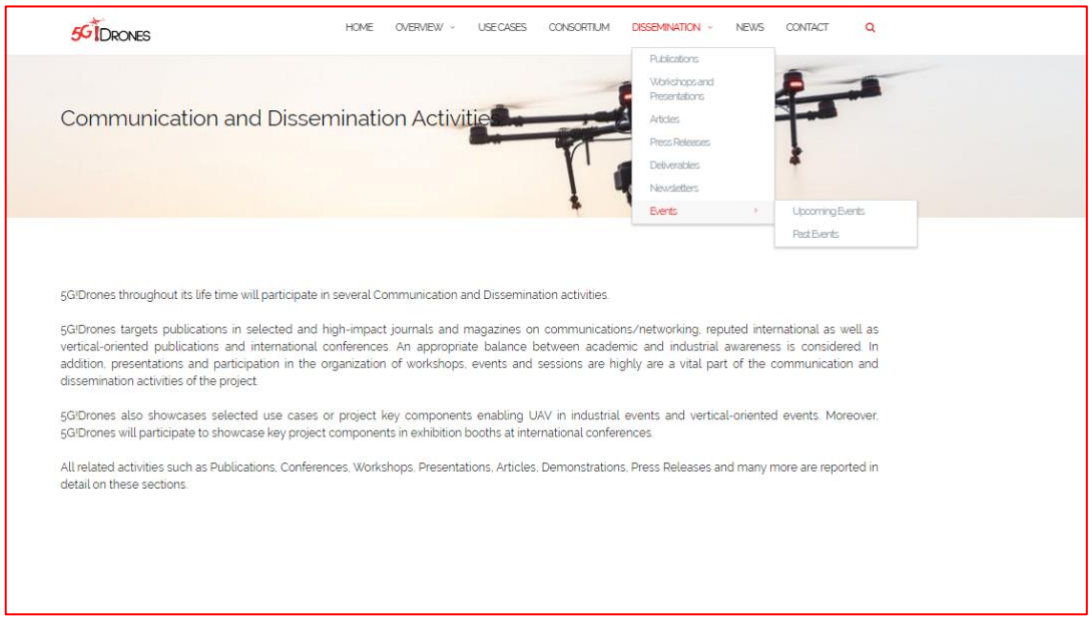

Figure 10: 5G!Drones website: 5G!Drones Dissemination Page and its subsections

Figure 11 illustrates the publications page. 5G!Drones papers and publications in journals, conferences, workshops, and books are presented in detail on this page.

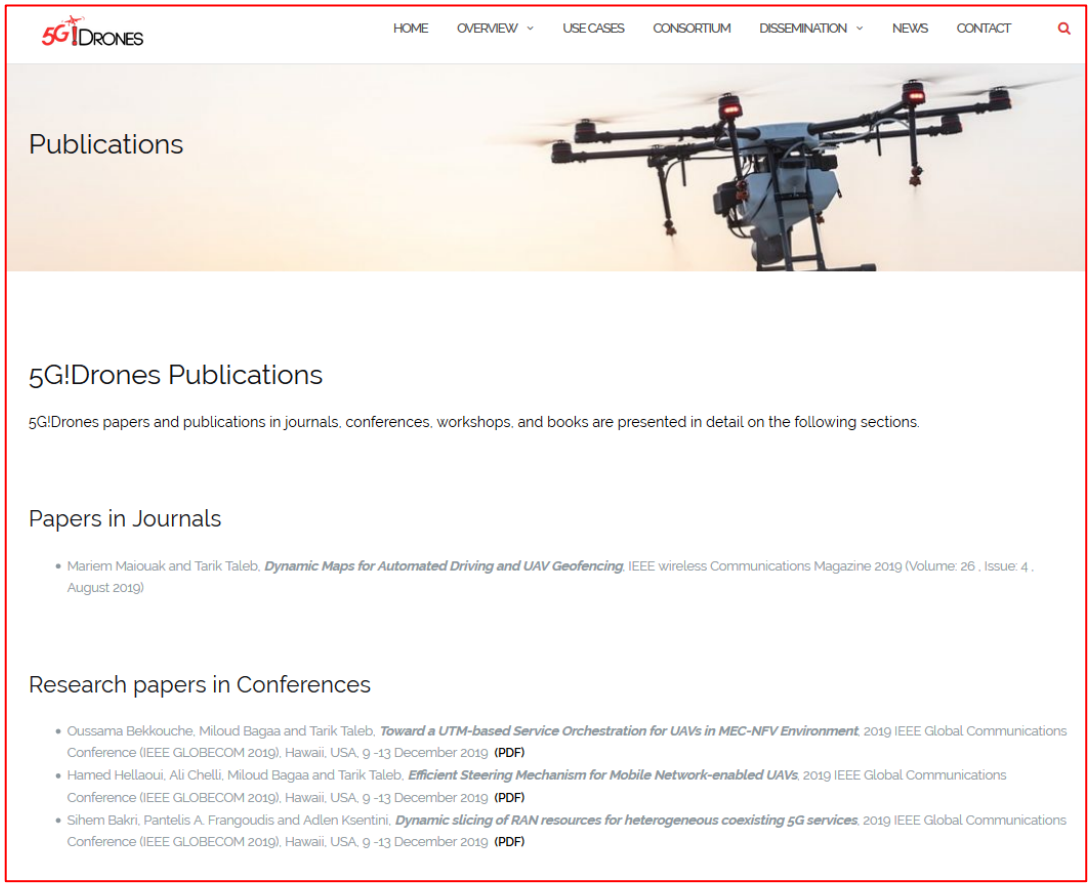

Figure 11: 5G!Drones website: 5G!Drones Publications

Figure 12 illustrates the workshops and presentations subpage (which is located under the dissemination menu page). The workshops and presentations page portrays the workshops and presentations conducted by the 5G!Drones partners within the entire framework and lifespan of the project.

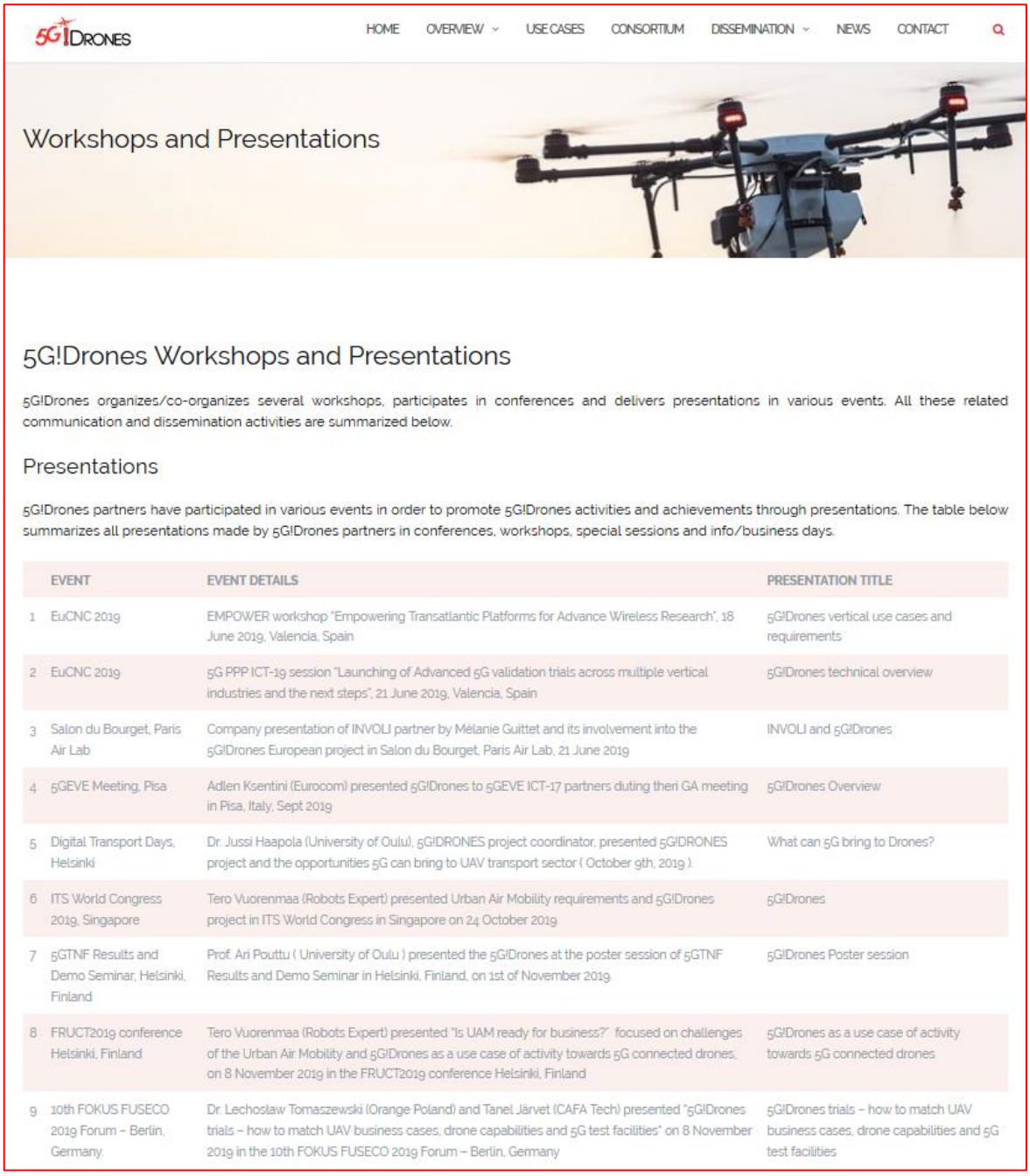

Figure 12: 5G!Drones website: 5G!Drones Dissemination Page and its subsections

Figure 13 depicts the Newsletters page which is incorporated within the Dissemination section. The Newsletters page is quarterly updated with the published newsletter issues, touching on the latest achievements and emerging news relevant to the 5G!Drones project. Visitors can easily access and download all newsletter issues in pdf format.

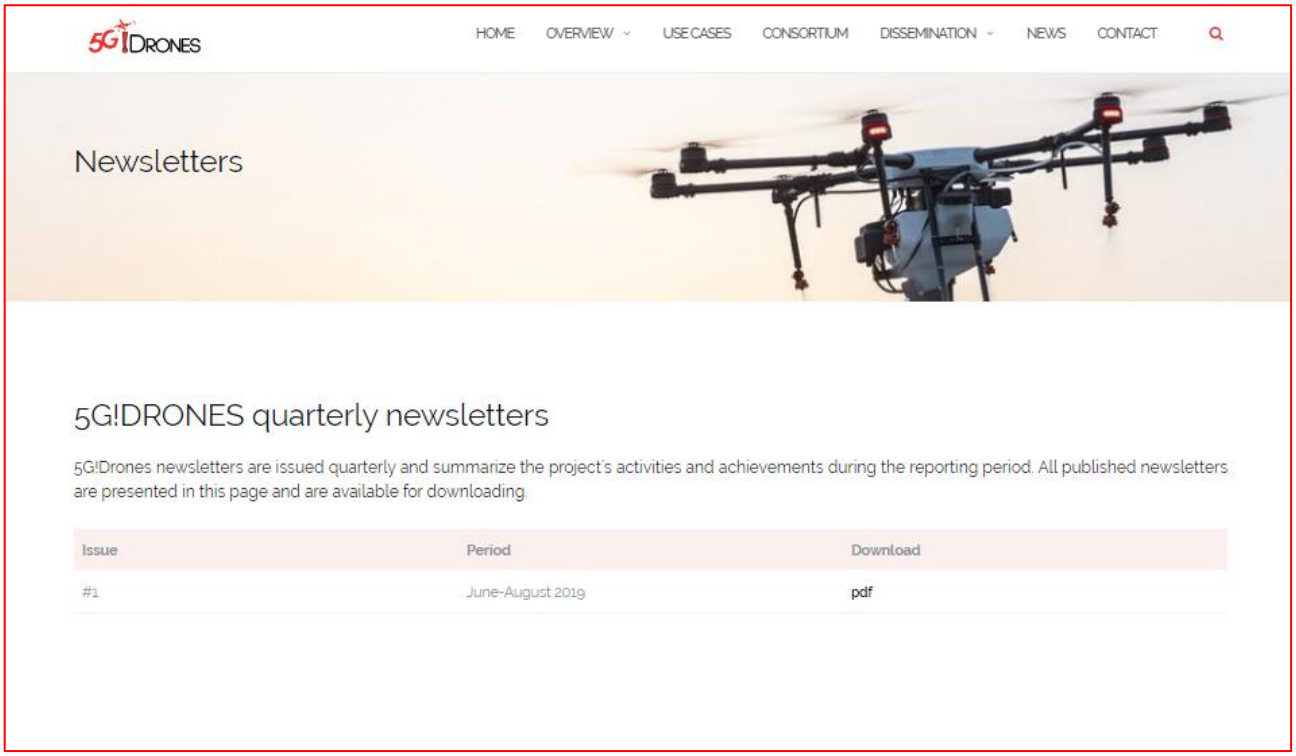

Figure 13: 5G!Drones website: 5G!Drones Newsletters Page

Figure 14 illustrates and points out former events featuring important workshops, conferences, and presentations that the 5G!Drones partners have conducted themselves or they have actively participated in.

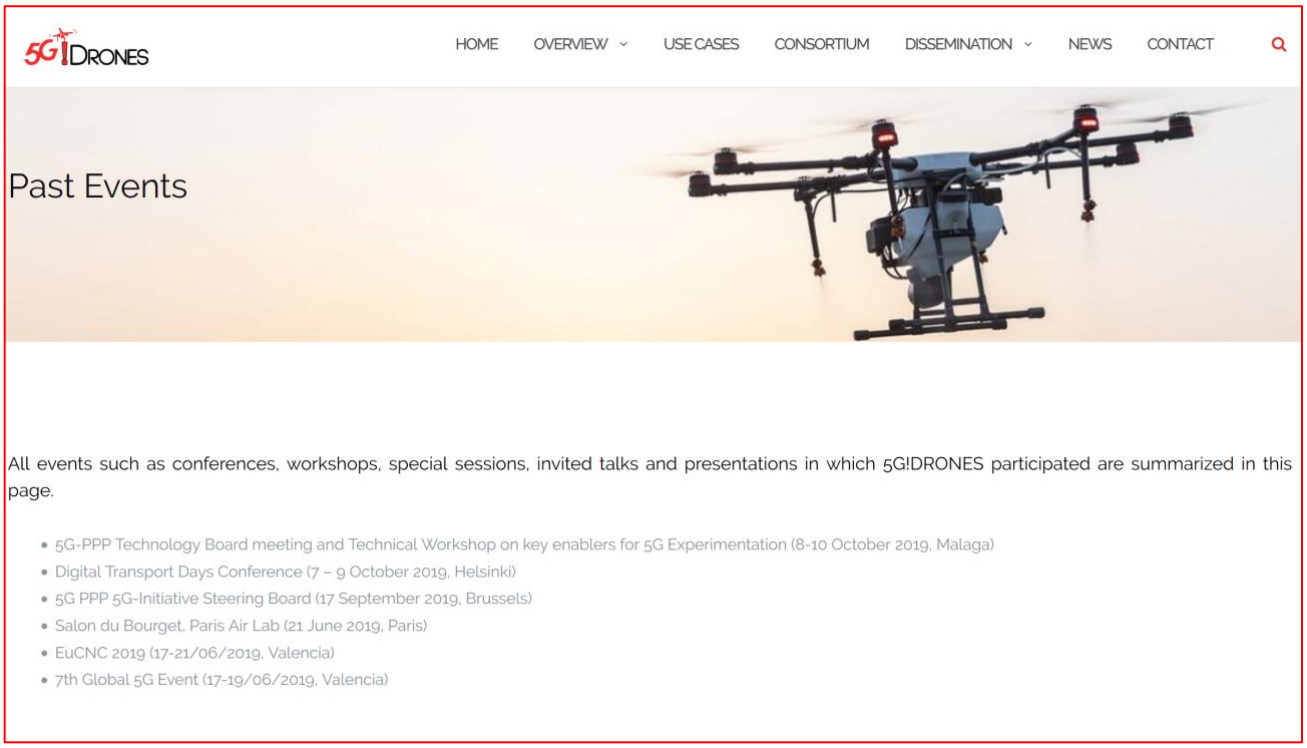

Figure 14: 5G!Drones website: 5G!Drones Past Events Page

The 5G!Drones website is constructively being developed in order to reach maturity including high quality research, findings and recommendations from all partners. In this perspective, all dissemination and news sections of the website will be updated and enriched throughout the course of the project including specialized events, articles, papers and additional relevant information/news.

Furthermore, some sections (e.g. articles, press releases) are integrated and in place expecting the corresponding dissemination activities and required information to be hosted when actually performed as the project progresses. For instance, Figure 15 illustrates the articles page which will host 5G!DRONES articles published in several media (digital and non-digital) such as newspapers, websites, magazines, newsletters etc.

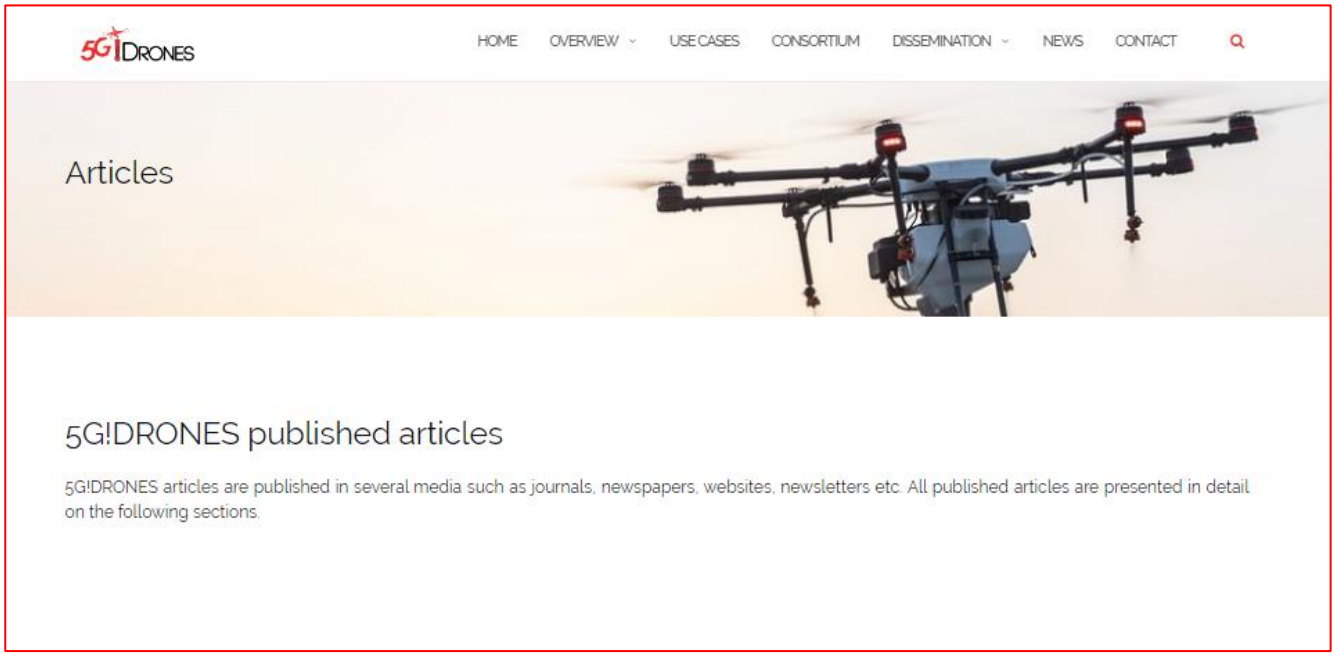

Figure 15: 5G!Drones website: 5G!Drones Articles Page

- **News:** This section is regularly updated with content including project events, activities, news and other impactful dissemination material upon being published. The “News” page offers a preview of 5G!Drones published news where visitors can scroll and click on a selected published article and be redirected to the respective page where the full article is made available (Figure 16).

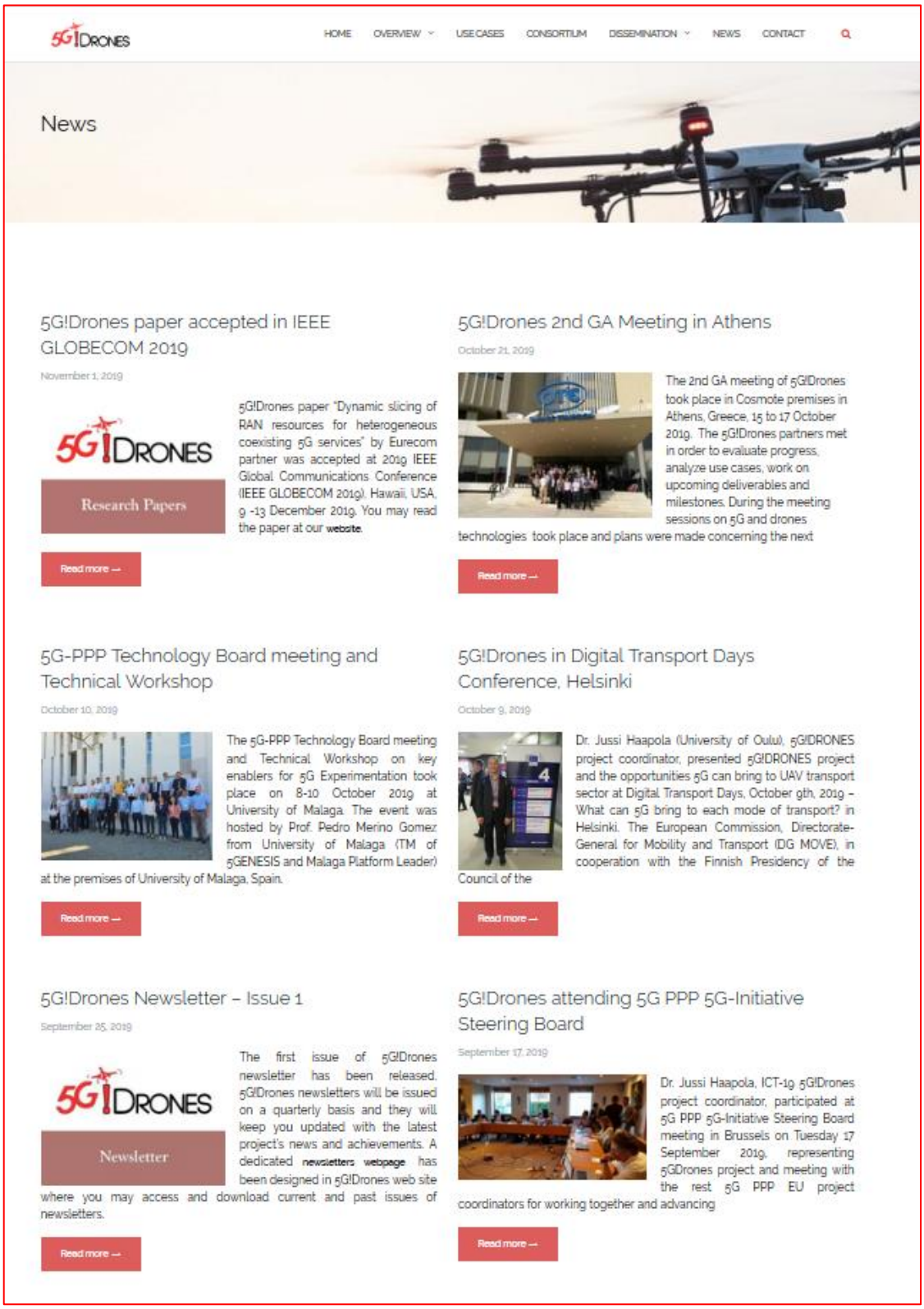

Figure 16: 5G!Drones website: 5G!Drones News Page

- **Contact:** The contact form is an integral part of the website and serves as a bidirectional means of interaction among the stakeholders of the project and the project team. In this section emerging issues and queries are explicated and, upon receipt, they are addressed accordingly by the 5G!Drones administration team (Figure 17).

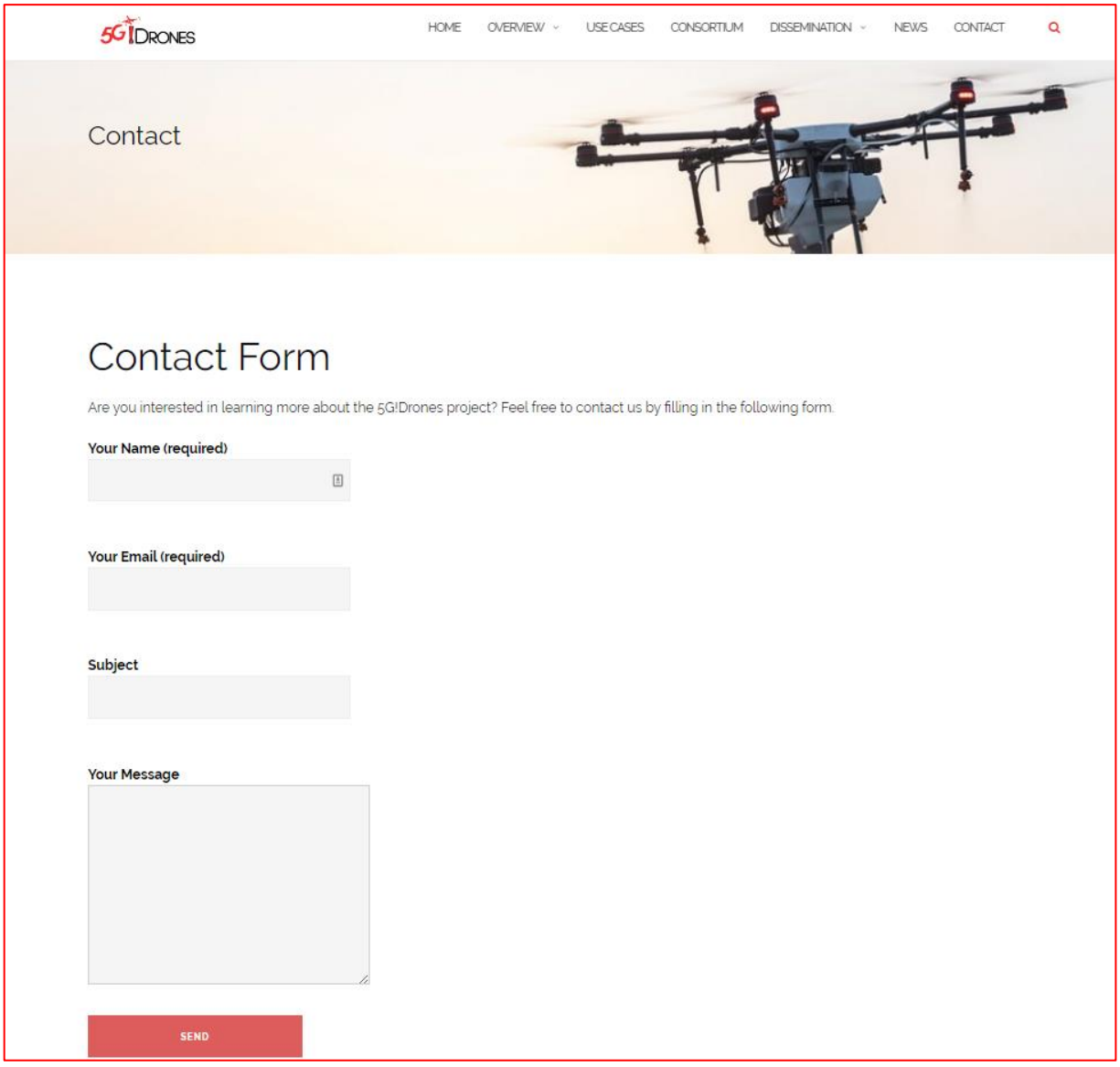

Figure 17: 5G!Drones website: 5G!Drones Contact Form Page

Moreover, within the main menu section a search engine is provided prompting the users to search for keywords or information that they are looking for in regards to the 5G!Drones project (Figure 18).

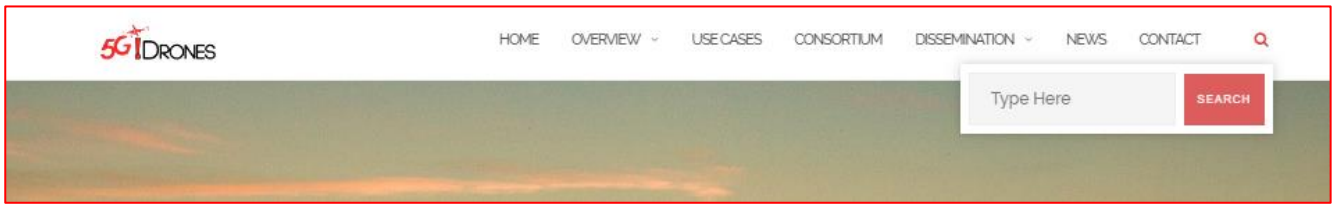

Figure 18: 5G!Drones website: 5G!Drones Search tool

Furthermore, clickable icons of the 5G!Drones social media channels exist at the footer of the home page through which users can easily visit the respective channels. In addition, the footer integrates relevant keyword tags, originating from the posted news and articles, prompting the users to search for specific and widely used terms reflecting to the corresponding news/posts category (Figure 19).

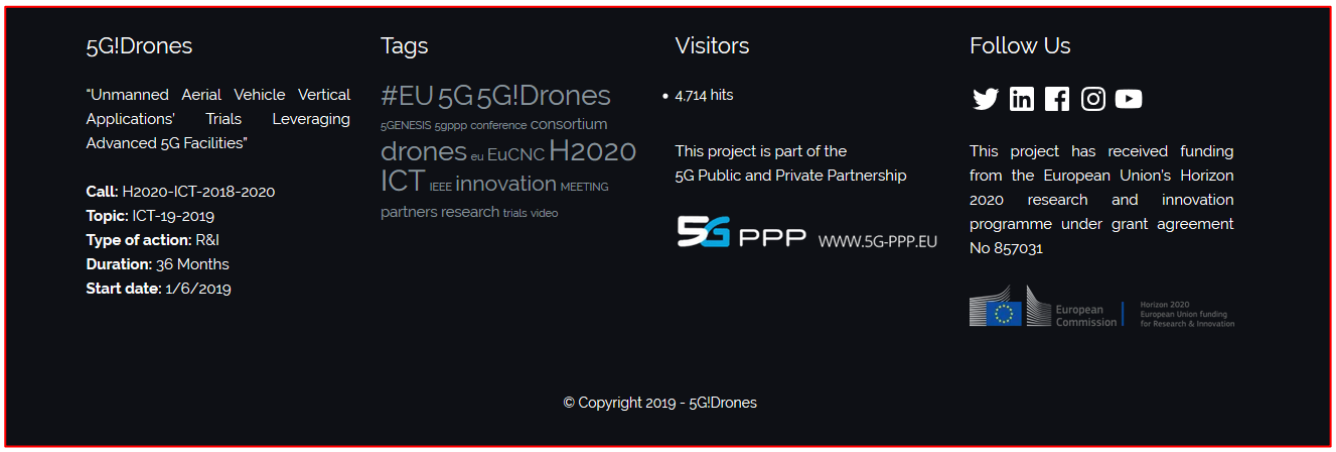

Figure 19: 5G!Drones website: 5G!Drones Footer

2.3.3. 5G!Drones Social Media Channels

5G!Drones is present in all popular social media networks. In specific, the following 5G!Drones social media accounts are open and have been actively used since the beginning of May 2019: Twitter, LinkedIn, Facebook, Instagram and YouTube and their access links are the following:

Twitter: https://twitter.com/5gdrones

LinkedIn: https://www.linkedin.com/in/5gdrones/

Facebook: www.facebook.com/5gdrones

Instagram: https://www.instagram.com/5gdrones_project/

YouTube: https://www.youtube.com/channel/UChPj4gQ5P5go7Fer6NJxGOQ

5G!Drones social media posts are oriented towards promoting the project's news as well as the dissemination activities in which the partners participate. Dissemination activities will cover a wide

spectrum of events, publications, presentations, workshops, demonstrations, call for papers and other relative activities communicated via the social media accounts.

Specifically, the social media posts cover the following activities:

- News and updates on the 5G!Drones activities (coverage of activities that the 5G!Drones partners participate in) and progression of project's tasks and deliverables
- Papers and presentations originating from workshops, conferences, journals etc.
- White papers
- Project showcases/demonstrations
- Publications in articles, online sources, newspapers
- Upcoming events prompting stakeholders for papers (CfP) and events participation
- Videos and photos
- Partners 5G!Drones related activities and achievements
- Newsletter issues
- Articles on popular 5G and Drones topics

In addition, all communicative 5G!Drones social media channels can be found in the footer of the project's official website (www.5gdrones.eu). Each of those social media icons, when clicked, may redirect the users to the respective 5G!Drones social media channel (you may refer to Figure 19). Moreover, the social media channels, amongst others, have an important role in promoting the 5G!Drones newsletter (new and past issues). Once the newsletter is released, a relevant post is published in order to prompt the users to read the new issue from the respective link of the official website.

During the first four months of the project's initiation, content was intensively communicated in a unified way among all the project's social media accounts in the form of posts. This strategy was utilized in order to capture a wider cluster and synchronously raise the projects (brand) awareness, its scope, milestones and overall objectives. Social media channels are critical in projecting the project's attributes to reach the respective segments via the corresponding digital channels. In parallel, the 5G!Drones project's role and aim is conceptualized by stakeholders via the synergetic high quality research, pilot trials, informative content and the events communicated via the social media channels. The communication pipeline was formulated and communicated regularly on a weekly basis including at least two-three posts per week. In this context, the adaptation of such digital strategic communications foresees to establish the 5G!Drones online presence appealing to existent segments but also familiarize and attract new perspective users/followers.

Since the beginning of October, the focus of the social media accounts has been altered to a new differentiated, per content and targeted audience, strategy. Twitter and LinkedIn accounts focus on targeting and captivating a more technical based, scientific and cognizant audience, relevant to the project's specifics. Whereas Facebook and Instagram point out to a broader and wider cluster further concentrating on the general population with limited technical knowhow, positioning, communicating and engaging them with "more easy to understand" informative posts (e.g. dissemination activities, articles etc.)

In addition, since September 2019, many of the social media posts embody a distinctive title "LearnAbout5GDrones", in the form of a hashtag (#LearnAbout5GDrones). When rationalizing, such posts are directed to the project's audience differentiating them in this way from the more general posts. In this perspective, project news, activities and achievements are easily grouped for easier spotting and searchability. Additionally, at times where general assembly meetings, workshops or other events take

place, the 5G!Drones social media channels have an active role offering immediate coverage of the events to engage and attract stakeholders and even more followers.

In parallel to the other social media channels, YouTube is a communication channel which will promote and communicate special videos from various events in which project's partners have actively participated. Overall, the 5G!Drones YouTube channel will divert its strategy in comparison to the utilized 5G!Drones social media accounts by promoting the project via videos of events, presentations, workshops, interviews and tutorials.

2.3.3.1. 5G!Drones Twitter account

As a result of the strategy followed so far at all social media channels is the fast accumulation of followers. Figure 21 presents the 5G!Drones Twitter profile page. From the specific profile page, a user can be redirected to the 5G!Drones posts made over Twitter, access followers posts, read project identity and info, and also redirected to 5G!Drones official website when clicking the link residing below the project's bio.

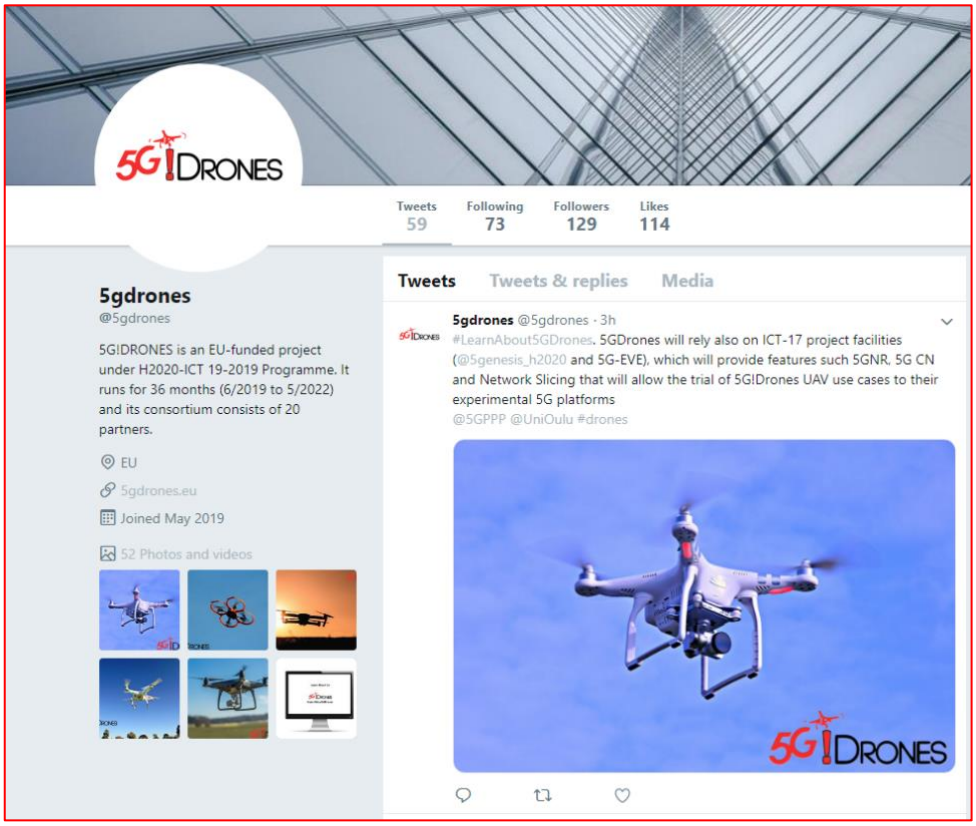

Figure 20: 5G!Drones Twitter Profile

Concerning performance so far, Table 2 reflects the number of followers and posts spanning from May to September 2019 on Twitter. As per plan, it is observed a steady increase in the followers every month, while an average posting activity of more than 8 posts per month is well maintained.

Table 2: Twitter Followers and Posts per Month

Twitter				
May - September 2019				
	May-June	**July**	**August**	**September**
Total Followers	72	88	110	131
Posts per Month	16	9	11	14

Similarly, Figure 21 depicts in graph the followers and posts from the start of the project (May) until September 2019, showing the steady growth rate of the twitter followers and the continuous content generation activity in the specific channel.

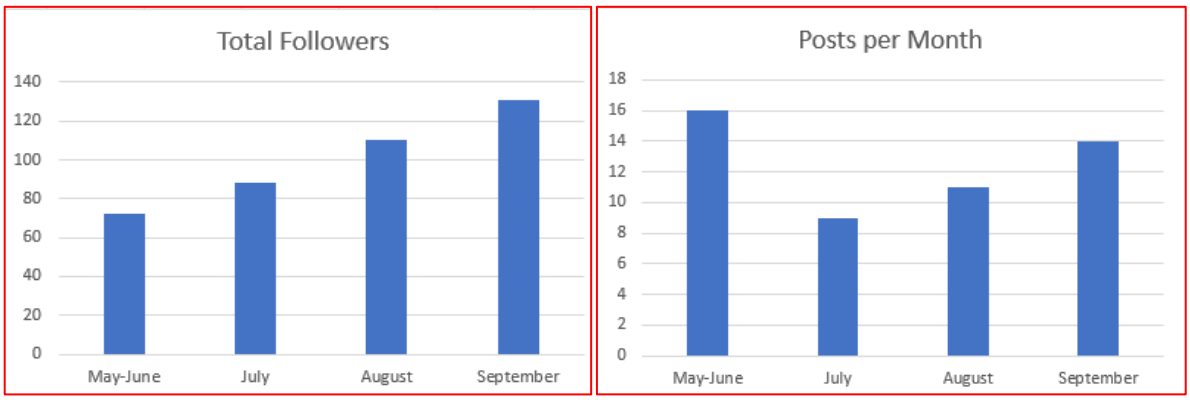

Figure 21: Twitter Followers and Posts per Month

2.3.3.2. 5G!Drones LinkedIn account

Figure 22 presents the official 5G!Drones LinkedIn profile. There is a short bio of the project including its objectives and quantitative details. The audience can easily check the latest project posts and communicate directly with the 5G!Drones team in case of any queries.

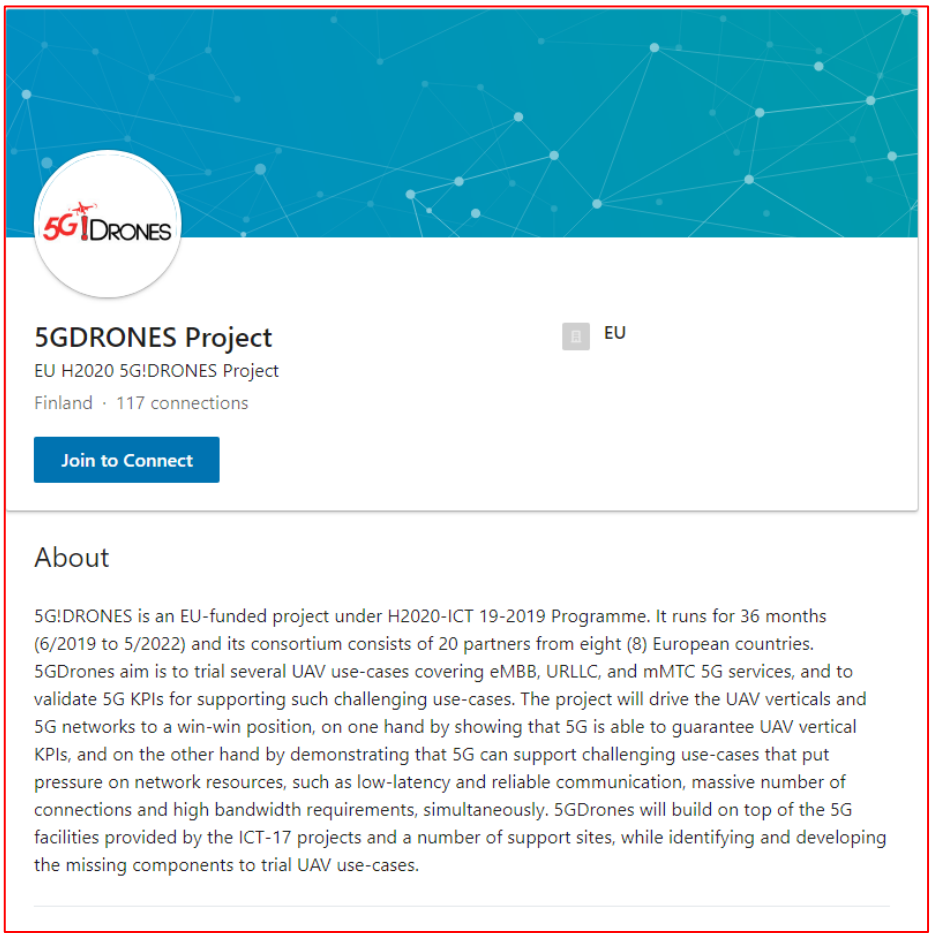

Figure 22: 5G!Drones LinkedIn Profile

The table below reflects the LinkedIn followers and posts of the project's initiation till September 2019. The number of followers is constantly increasing , following a growth rate of approx. 25% for the reporting period, maintaining a engagement activity of at least 2 weekly posts.

Table 3: LinkedIn Followers and Posts per Month

LinkedIn				
May - September 2019				
	May-June	**July**	**August**	**September**
Total Followers	60	103	121	149
Posts per Month	19	10	13	14

Figure 23 similarly reflects on the LinkedIn followers and posts during the start of the project up to September 2019. We observe that the followers in LinkedIn page are steadily increased, while the content generation activity is maintained in an average rate of approximately 12 posts per month.

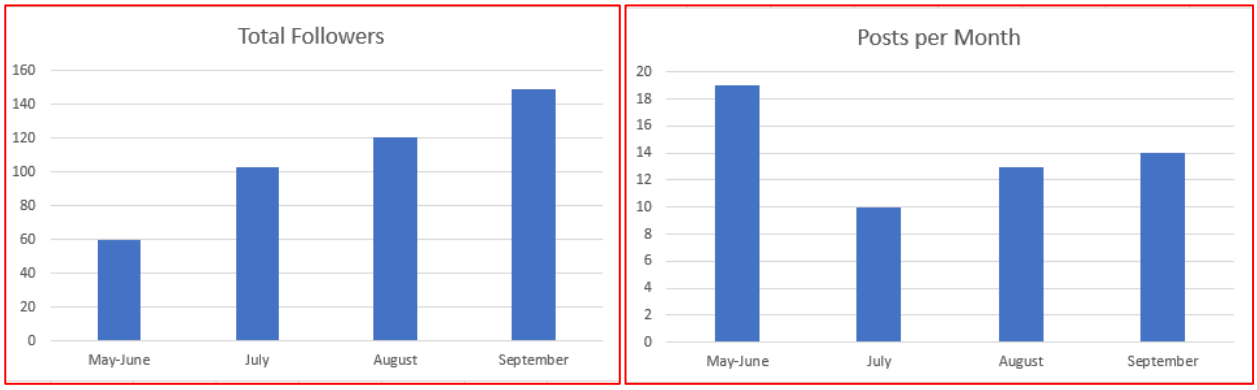

Figure 23: Linkedin Followers and Posts per Month

2.3.3.3. 5G!Drones Facebook account

Figure 24 lays out the 5G!Drones Facebook profile page. Within the Facebook page, users can find the latest 5G!Drones posts, get informed on the latest news of the project and send an immediate message to the 5G!Drones team.

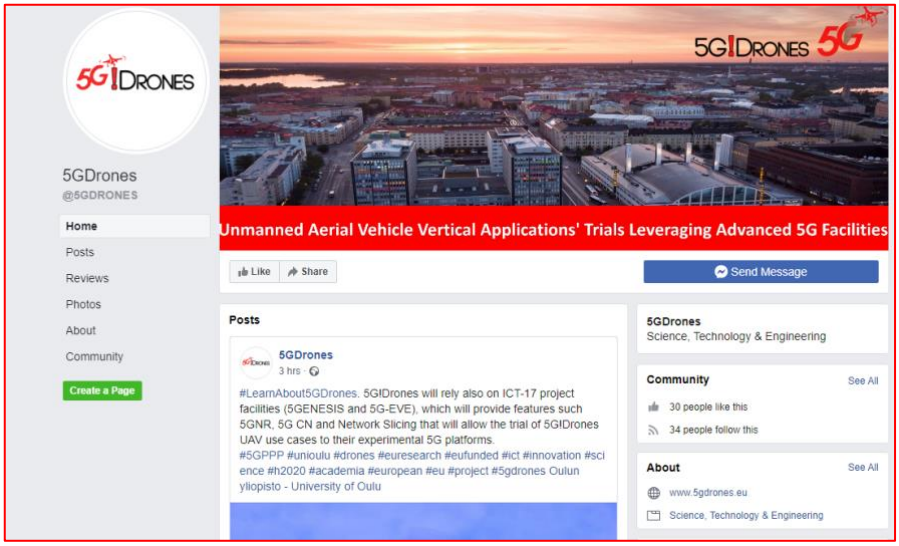

Figure 24: 5G!Drones Facebook Profile

The table below summarizes the Facebook followers and posts since the project's initiation up to September 2019. Since the Facebook page refers to the general public, the followers repository is increased on a slower rate than the business-driven communication channel, but yet it attracts new followers every month.

Table 4: Facebook Page Likes and Posts per Month

Facebook				
May – September 2019				
	May - June	**July**	**August**	**September**
Page Likes	20	22	22	30
Posts per Month	19	11	12	14

Similarly, Figure 25 depicts the Facebook page likes and posts since the start of the project till September 2019. The average content creation activity is approximately 12 posts per month, having achieved to attract 30 followers till the end of September. As the project progresses and results that are of higher interest to the general public will be produced, we are expecting the followers of the page to be significantly increased.

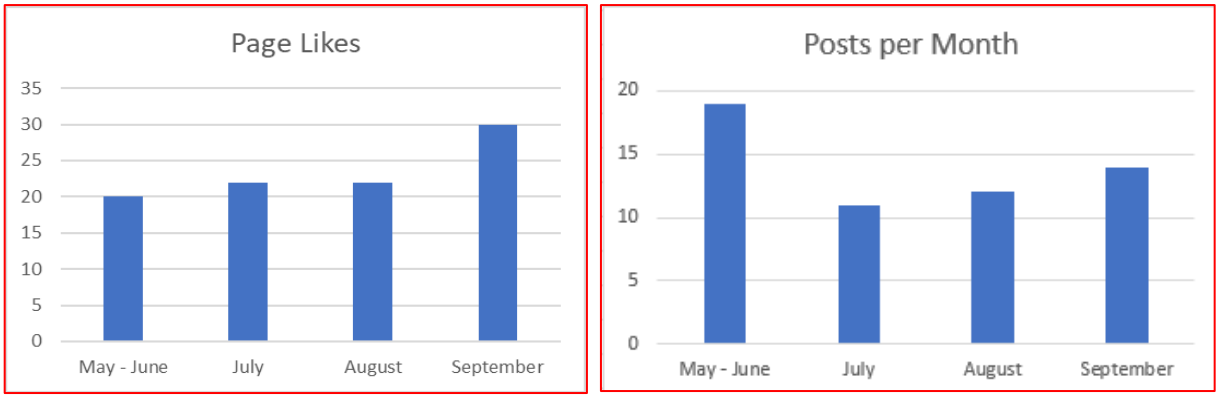

Figure 25: Facebook Page Likes and Posts per Month

2.3.3.4. 5G!Drones Instagram account

Figure 26 brings forth the official 5G!Drones Instagram profile and posts/pictures. Users herein can be also redirected to the official 5G!Drones website when clicking on the relevant link included in the profile page.

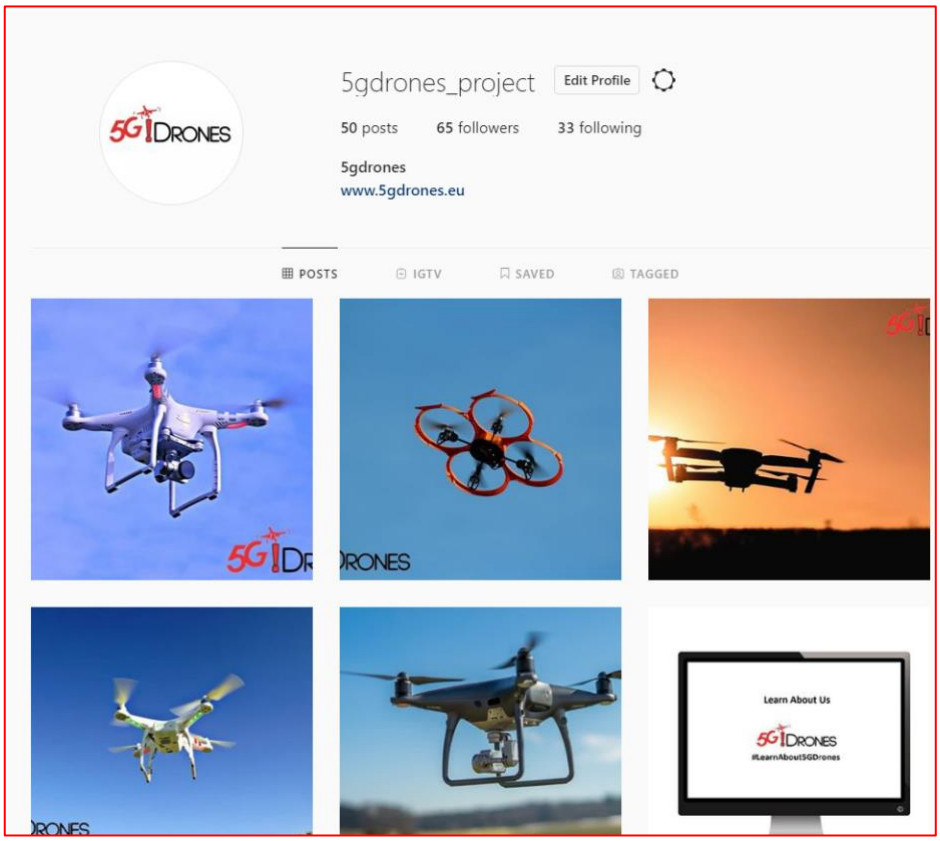

Figure 26: 5G!Drones Instagram Profile

Table 5 depicts the Instagram followers and posts from the project's initiation to September 2019. A steady growth rate of approx. 5% is maintained with a content creation activity of approximately 12 posts per month.

Table 5: Instagram Followers and Posts per Month

Instagram				
May – September 2019				
	May - June	**July**	**August**	**September**
Total Followers	56	60	62	66
Posts per Month	18	8	10	14

Similarly, Figure 27 shows graphically the Instagram followers and posts spanning from the start of the project (May-June) until September 2019.

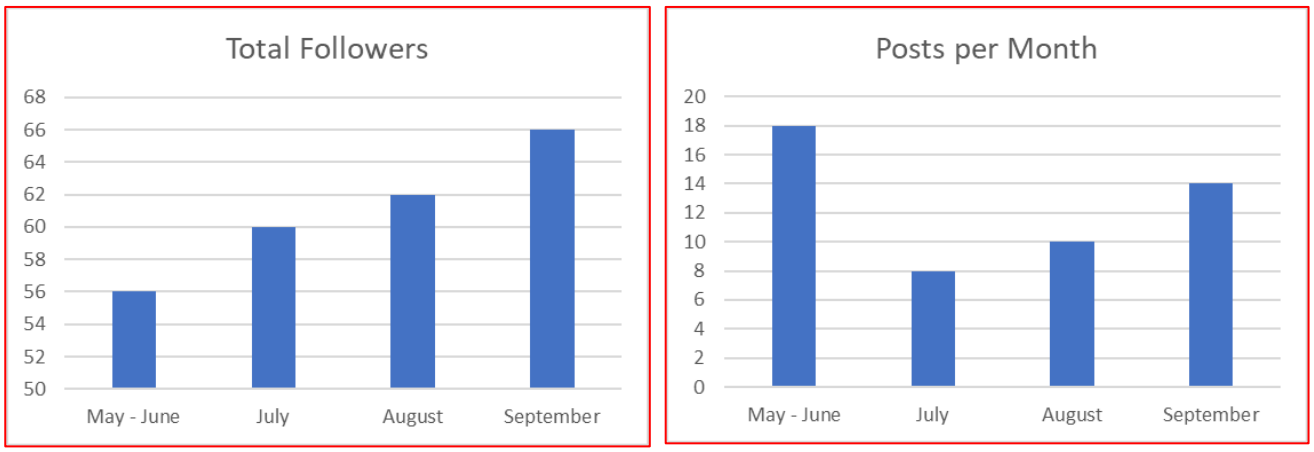

Figure 27: Instagram Followers and Posts per Month

2.3.3.5. 5G!Drones YouTube channel

The official 5G!Drones YouTube profile is shown in Figure 28. As already mentioned in previous section, the YouTube channel is not updated constantly, on a weekly basis as the rest social media channels since it is used for the promotion/showcasing through videos of various events, interviews, demonstrations, that the project's partners preform/participate. Currently a video featuring the 5G!Drones presentation at EuCNC 2019 by project coordinator is presented. As per communication plan, more videos will follow as project partners participate in even more events and activities.

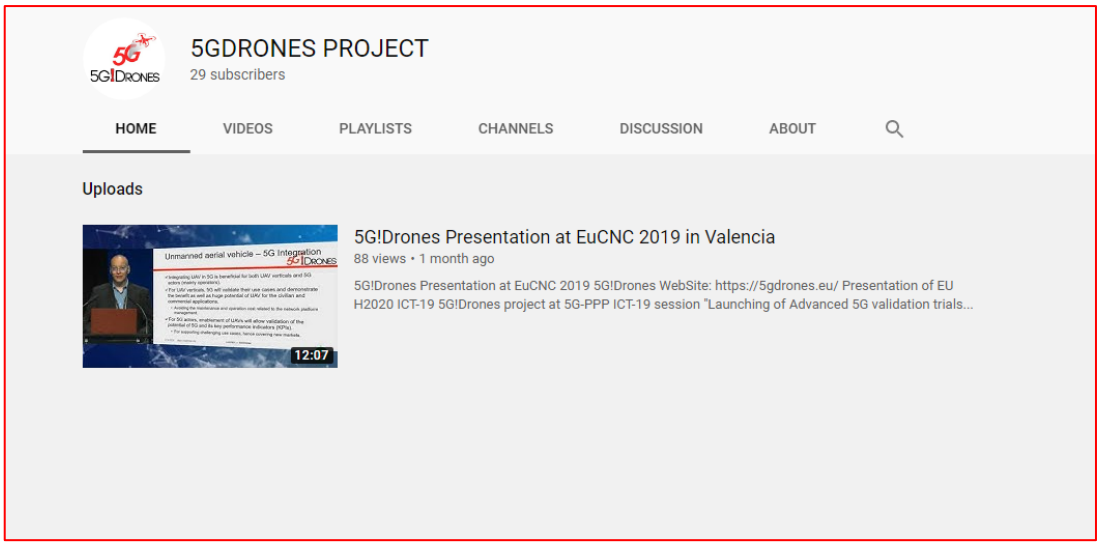

Figure 28: 5G!Drones YouTube Profile

2.3.4. 5G!Drones Newsletter

The 5G!Drones newsletter is published on a quarterly basis and shared with the public via the project's social media accounts and website. Each newly issued newsletter is uploaded to the official website, prompting the users to read it online or download it. Moreover, the 5G!Drones social media accounts will actively promote each issue by providing a direct link to the official website's respective page. In specific, the first issue of 5G!Drones newsletter is available online and can be accessed by the following link:
https://5gdrones.eu/wp-content/uploads/2019/09/5GDrones-Newsletter-Issue-1.pdf


5G!Drones Newsletter – Issue 1 (June – August 2019)

5G!DRONES

Unmanned Aerial Vehicle Vertical Applications' Trials Leveraging Advanced 5G Facilities

5G!Drones PROJECT OVERVIEW

5G!Drones is a EU-funded project under H2020 - ICT 19 - 2019 Programme. It runs for 36 months (6/2019 to 5/2022) and its consortium consists of 20 partners from eight (8) European countries.

The 5G!Drones project aims to trial several UAV use cases that cover eMBB, uRLLC and mMTC 5G services, and validate 5G KPIs which apply to support such challenging use cases, and to enhance them with powerful features. Moreover, 5G!Drones will propose novel methods for UAV traffic management services made possible by the underlying 5G technology. 5G!Drones will build on top of the 5G facilities provided by the ICT-17 projects, while identifying and developing the missing components to trial UAV use cases. Furthermore, 5G!Drones will feature Network Slicing (NS) as the key component to simultaneously run the three types of UAV services.

The 5G!Drones consortium represents an excellent mixture of industrial and academic profiles from all over Europe, covering Verticals (Airbus, Thales, Hepta Airborne, CAFA Tech, Alerion, UMS, INVOLI, Frequentis), commercial network Operators (Orange France, Orange Poland, COSMOTE), Networking industry (NOKIA), SMEs (INFOLYSiS, Robots.Experts, DroneRadar), outstanding EU Research Centres (EURECOM, NCSR DEMOKRITOS), renowned Universities (UO and AU) and the Municipality of the Egaleo city. Relying on the expertise of 5G!Drones partners, several use cases have been identified which reflect key UAV applications covering civilian and commercial scenarios for which 5G is highly needed. The four 5G!Drones use case areas, which are implemented and tested using the 5G!Drones test facilities (two ICT-17 5G facilities and two partners' specific facilities), are the following:

UC1: UAV Traffic Management

UC2: Public safety/saving lives

UC3: Situation awareness

UC4: Connectivity during crowded events

INSIDE THIS ISSUE

1. 5G!Drones Overview
2. Dissemination and Communication Channels
3. Dissemination and Communication Activities
4. General Assembly Meetings

Figure 29: 5G!Drones Newsletter

2.3.5. 5G!Drones Leaflets and Posters

5G!Drones has created respective leaflets and posters serving as promotional material which provide information on the project objectives, use cases, goals, activities and achievements.

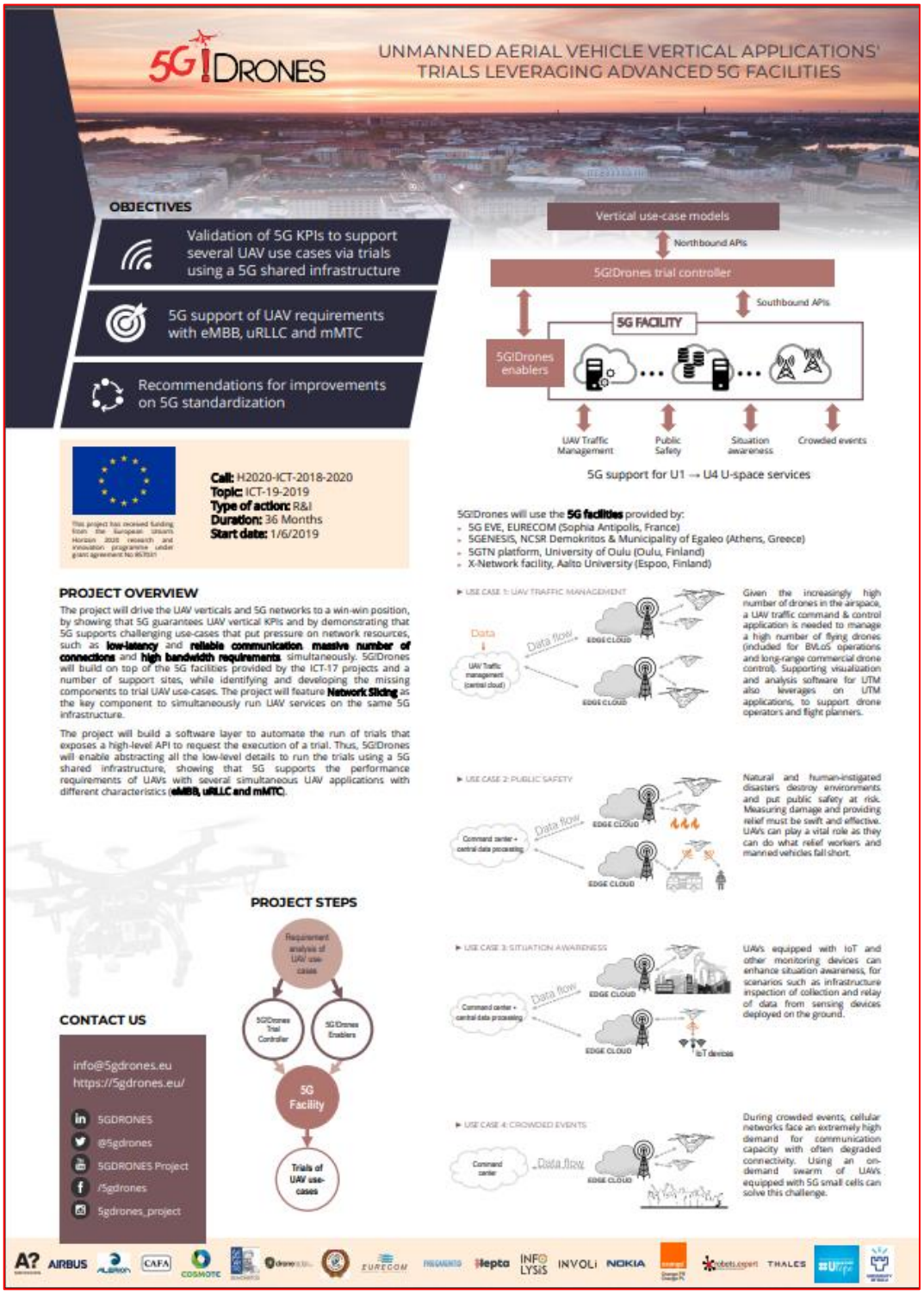

Figure 30: 5G!Drones Poster

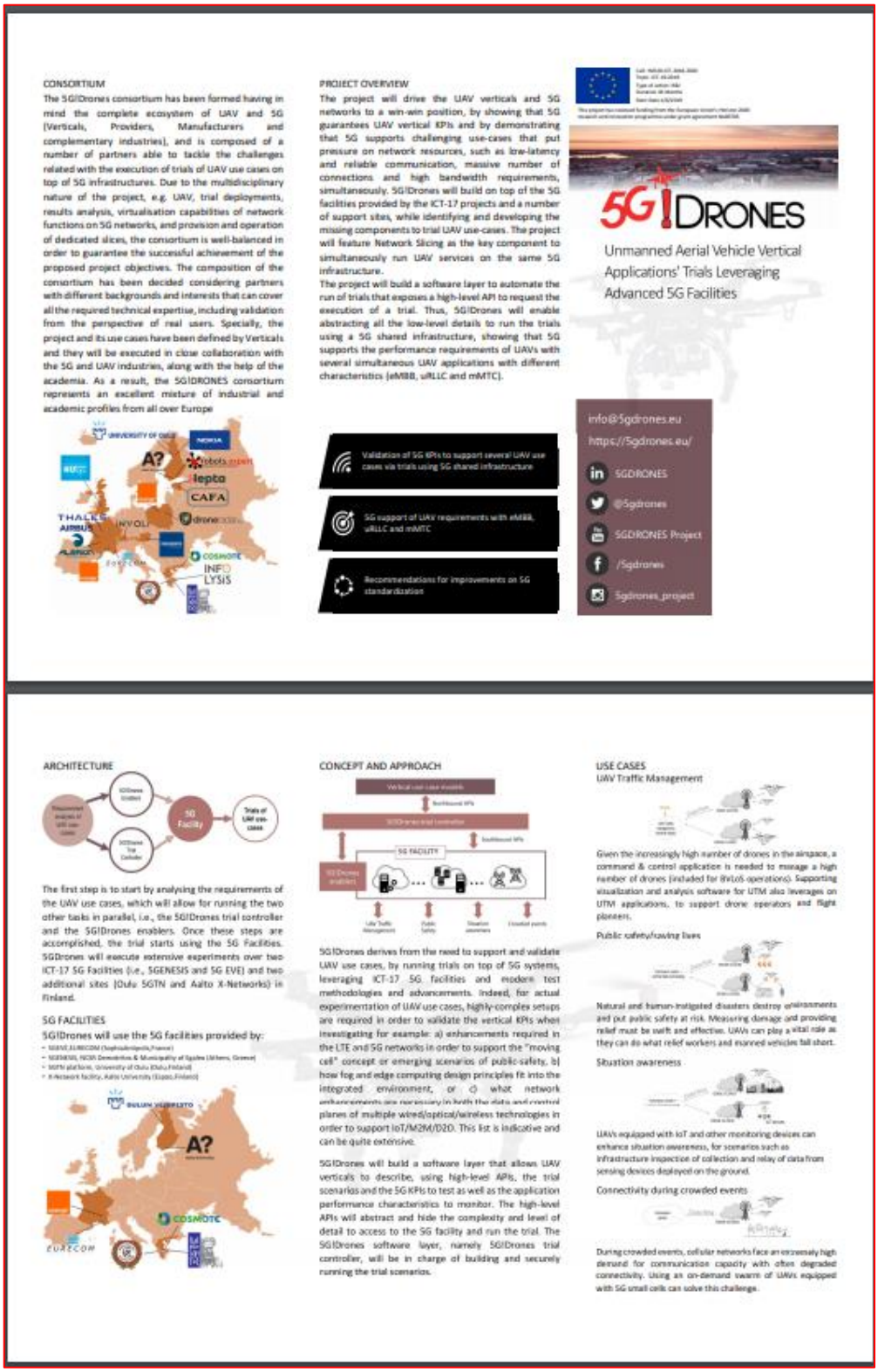

Figure 31: 5G!Drones Leaflet

2.3.6. 5G!Drones Press Releases

Press Releases are created and shared with media and press contacts (European and international) through our partners. Press releases will be issued by partners every time a great achievement or activity of the project needs to be communicated to the public media and the industry. The main objective of press releases is to gain publicity and to raise public awareness.

2.3.7. Other Means and Channels

A range of additional means and channels might be used in order to effectively promote and disseminate the project such as:

- Participation in conferences and events
- Peer reviewed publications in journals
- Publications in workshops/conferences
- Online articles
- Published articles in magazines/newspapers
- Interviews, as well as videos, which may be conducted by the partners, events that the partners participated or demonstrations
- Use of EU and 5G-PPP channels (e.g. websites, newsletters, newsflashes) for communicating 5G!Drones and stepping on findings

Additional information in regards to the above means and channels of dissemination are available in section 3.

2.4. Monitoring and Evaluation of Communication Activities

Throughout the project lifetime, the effectiveness of 5G!Drones communication channels will be constantly monitored and corrective actions will be applied whenever necessary. It is of vital importance the objectives and targets of 5G!Drones communication plan to be met, without deviations or underperformance. For that reason, a set of tools is used for securing the efficient and continuous monitoring and evaluation of communication channels and activities.

2.4.1. Online Repository and files

The 5G!Drones partners use the Microsoft Teams platform as a collaborative tool in order to share information relating to the project's tasks, prioritize work packages and remain intact and well organized to efficiently reproduce high quality outputs and activities. Moreover, the Teams platform is divided into various sections/folders linking to material in relation to each work package or general information of the project. The use of Teams is vital for the appropriate organization of the project's material and activities in order to act as an input for the communication channels and activities.

Figure 32: Microsoft Teams

Another internal communication tool exploited for monitoring activities is the 5G!Drones WP5 online Teams excel file, which is created, located and shared amongst partners via the Microsoft Teams platform. This file is used in order to record and monitor the activities of each partner (either upcoming, current or past along with their respective information) in respect to communication and dissemination aspects. Each partner is responsible to update regularly the excel sheet and inform the rest of the partners in relation to the performed communication/dissemination activities. This file acts as a source of input for news and activities that need to be communicated by 5G!Drones communication channels.

2.4.2. 5G!Drones Website and Social Media Statistical Dashboards

INFOLYSiS, task leader of 5G!Drones communication activities (T5.1), collects, processes and visualizes on a monthly basis data derived from the project's social media accounts and the website. In order for the data to be effectively employed, processed and visualized, Google Data Studio is also used. As part of 5G!Drones monitoring and evaluation mechanisms, the 5G!Drones statistical dashboards are issued monthly and are accessible online (URL provided) or through Teams where their links are uploaded in a pdf file (reference file where the links of all monthly dashboards per channel are maintained). The 5G!Drones Social Media and Website dashboards are regularly issued at the end of each month but they can be also issued upon request for a specified timeframe covering a longer period of the project's run (e.g. quarterly, semi-annually, annually).

The statistical dashboards closely monitor every month the performance of 5G!Drones communication channels upon various key performance indicators that may be common among all channels or may vary from channel to channel (based on the channel specifics). By comparing monthly dashboards, one can easily spot deviations and then apply corrective actions and revisions both on the communication strategy and content used (if required) but also on the management of the specific communication channels.

For indicative purposes, the links to the Statistical Dashboards of September 2019 are provided further below:

Twitter Dashboard link:

https://datastudio.google.com/open/1GoDPq-dJoQ6807V-gr_EsWzb9UgwSR2a

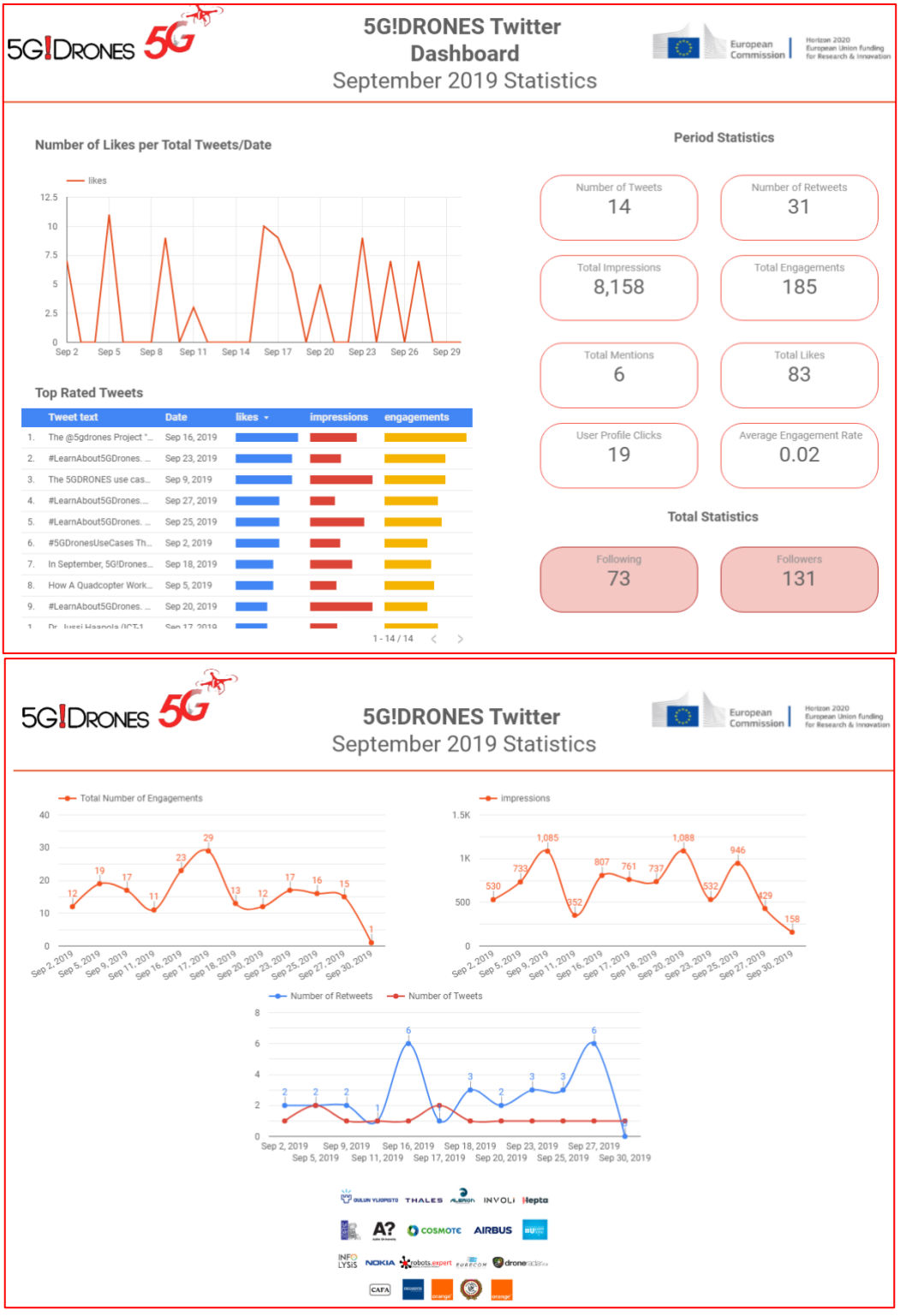

Figure 33: 5G!Drones Twitter Dashboard

LinkedIn Dashboard link:

https://datastudio.google.com/open/13A85McdkV15b4gY0prfJnG1YAAd7I9qf

Figure 34: 5G!Drones LinkedIn Dashboard

Facebook Dashboard link:

https://datastudio.google.com/open/1940b2fbAdFyeD-taMAjfpQw2EAMbAhBD

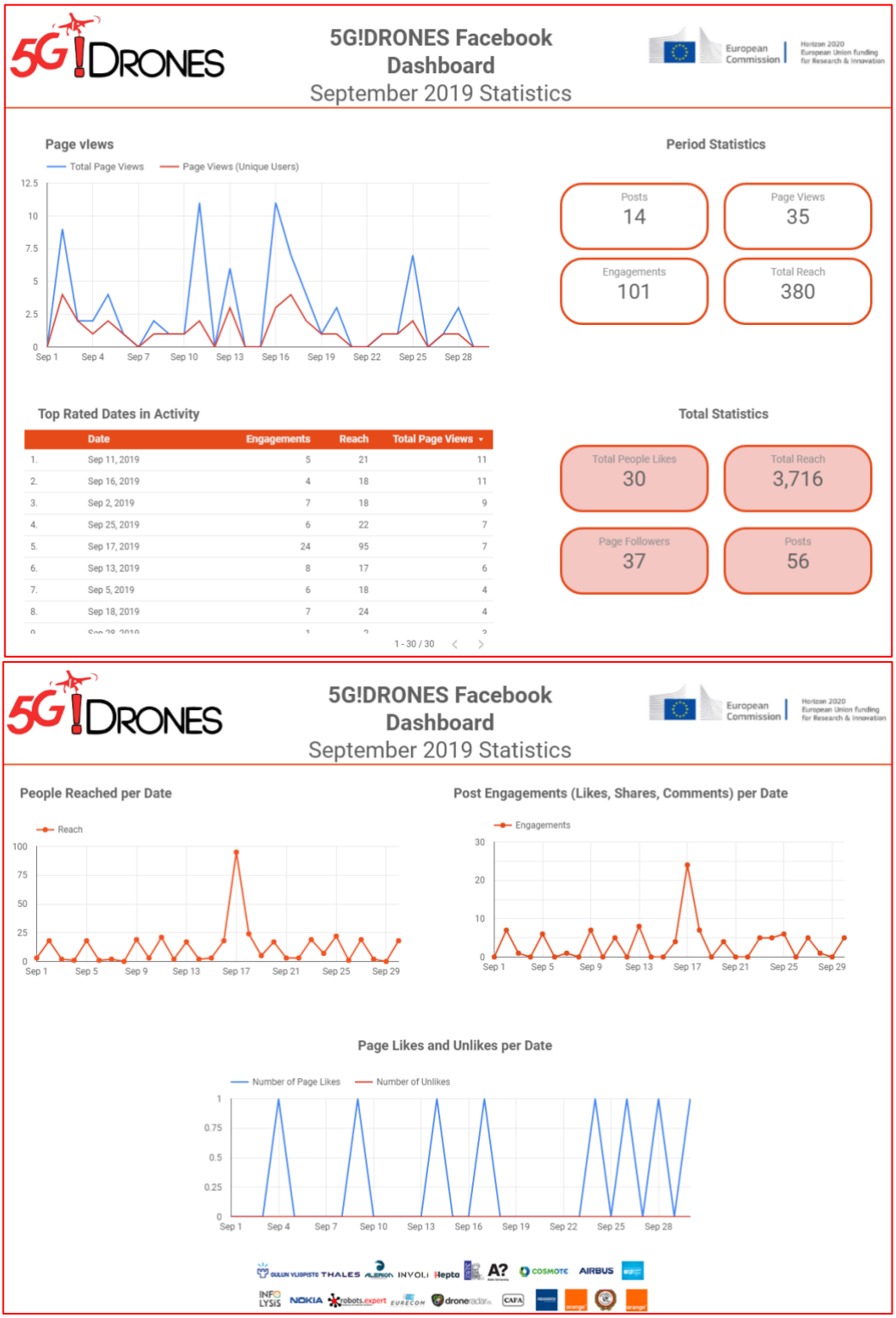

Figure 35: 5G!Drones Facebook Dashboard

Instagram Dashboard link:

https://datastudio.google.com/open/1-6MaLAQnmbViQ2Oinqdf1ehRtG72Jd48

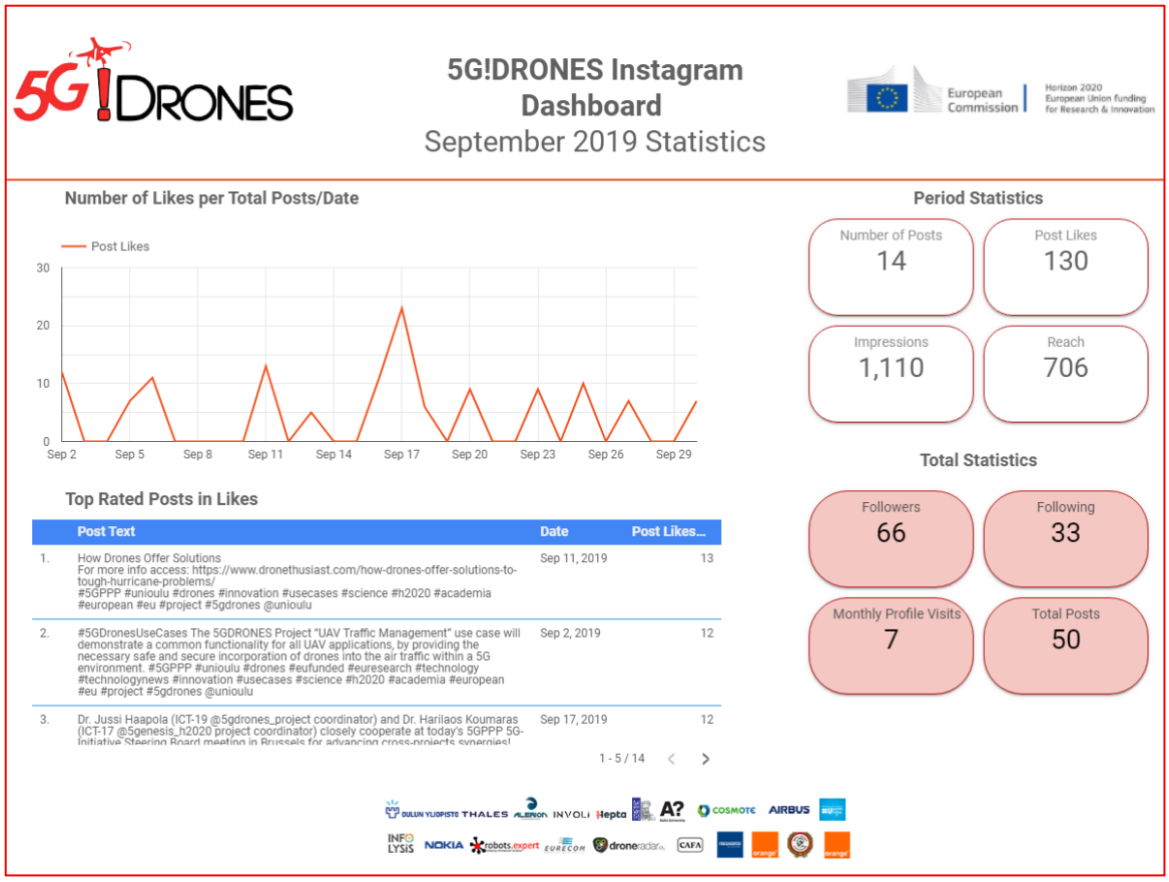

Figure 36: 5G!Drones Instagram Dashboard

5G!Drones Website Dashboard link:

https://datastudio.google.com/open/1tvUPrl3RvBrlbS_evnsmjs0agDyhI30A

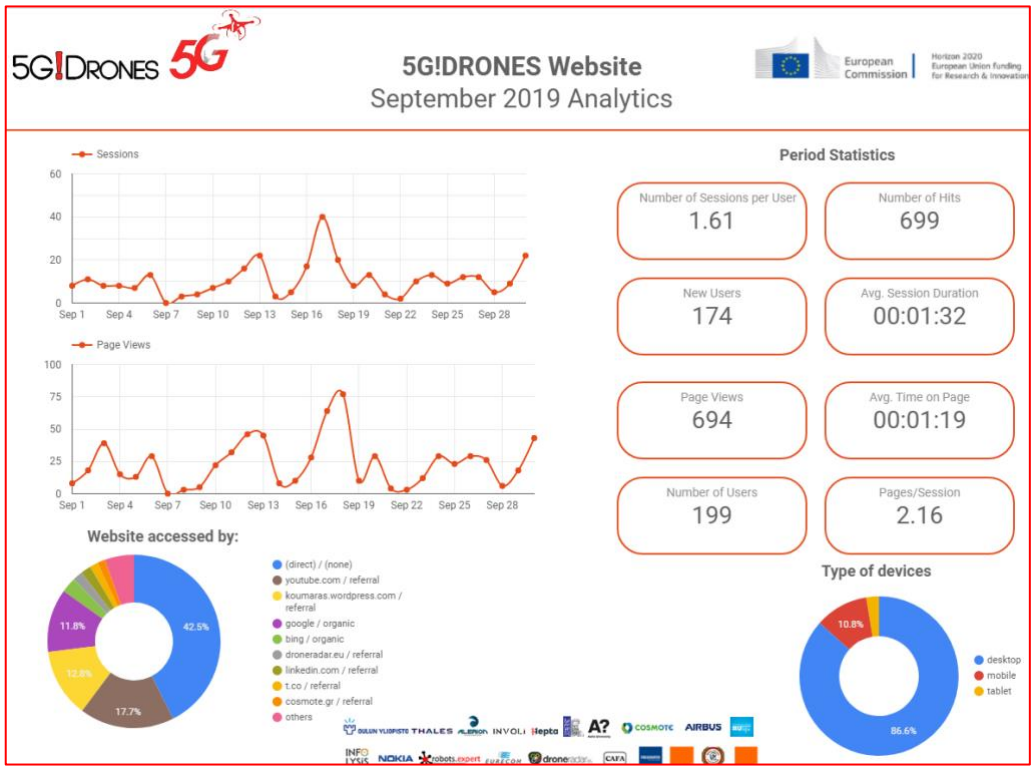

Figure 37: 5G!Drones Website Dashboard

2.4.3. 5G!Drones Website Google Analytics

Google Analytics is also used in order to derive additional website statistics regarding data of the user's sessions, locations and access screen preferences. Below we include excerpts of the Google Analytics statistics where information on new and returning visitors are evident, along with the devices that the users use for accessing the site, the website's views and the average duration of sessions. An indicative example is given by Figure 38, referring to statistics of the third week of September 2019.

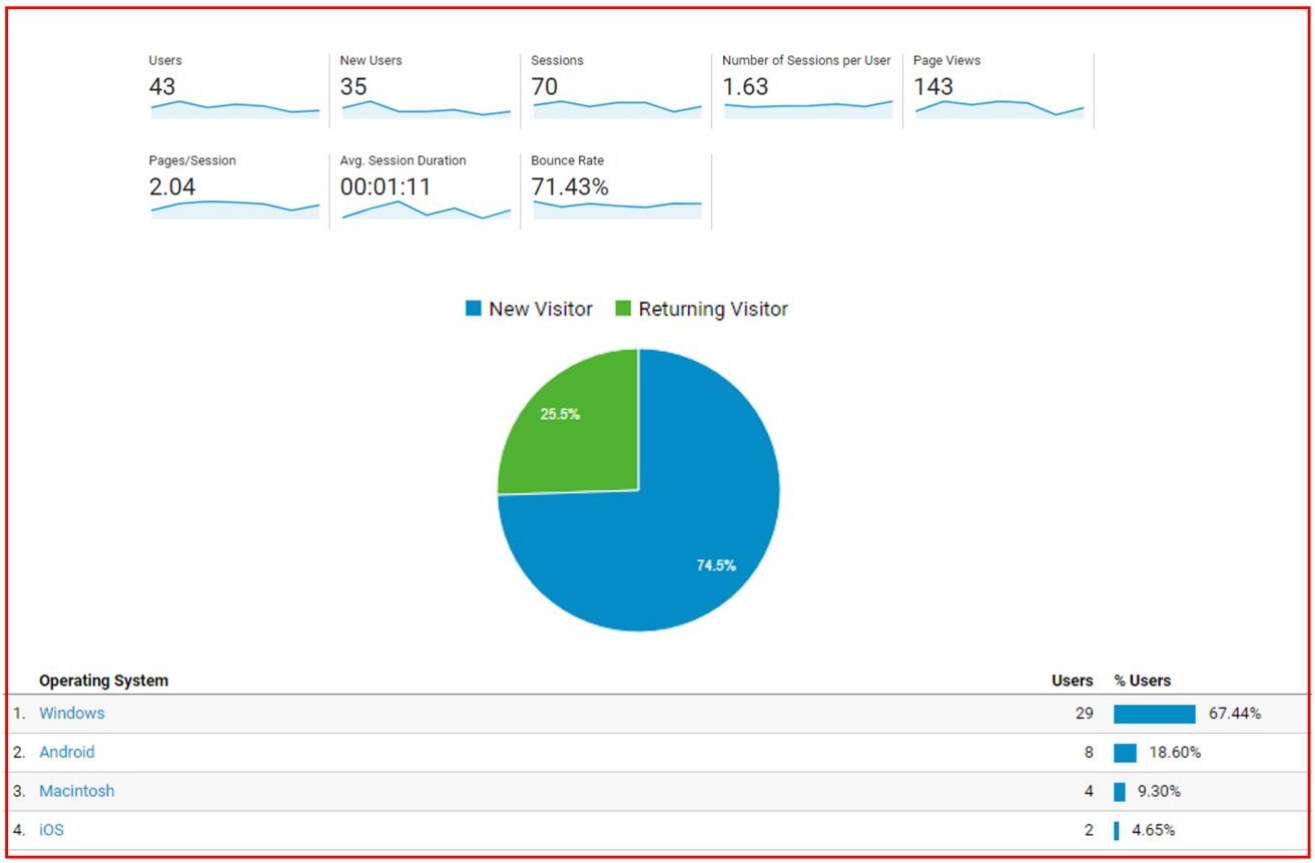

Figure 38: 5G!Drones Website Google Analytics

3. DISSEMINATION AND SHOWCASING PLAN AND STRATEGY

3.1. Introduction

3.1.1. Purpose and Objectives

Dissemination and showcasing activities are of crucial importance for the project's successful diffusion of knowledge, for raising awareness and for attracting potential supporters, industries and verticals as well as scientific interest. The main objectives that will be fulfilled by the 5G!Drones dissemination and showcasing actions are:

- To disseminate project outcomes to the scientific community.
- To disseminate and raise awareness of the project to relevant industries.
- To raise awareness of the project towards the most important stakeholders.
- To foster inter-communication with other research projects and communities.
- To disseminate and communicate project innovations to the broader public and society.

3.1.2. Target Audience

Following sections 1.3 and 2.1.2, where the targeted audience of this document and of the project's communication activities were presented respectively, dissemination and showcasing activities presented in the following sections are addressed at an even more targeted audience.

In specific, target audience of 5G!Drones dissemination and showcasing activities is the drone industry stakeholders and mobile network stakeholders. Drone industry stakeholders include mainly the drone manufacturers, drone component manufacturers, drone operators, National civil aviation agency bodies and research stakeholders in drones, but also stakeholders using drone services by operators. Mobile network stakeholders include 5G network manufacturers, telecom operators, and research stakeholders in Mobile technology. The targeted audience is also academia, research institutions and the scientific community overall.

3.2. Content and Strategy

All project partners will perform dissemination activities, but the content and the type will differ according to the nature of the partner and the targeted audience. The industrial partners will approach relevant standardization and regulatory bodies, industry-sectors, as well as their distributors and client networks, while the academic and research partners will mainly focus on disseminating the project results towards research institutes and universities. Such activities will prepare the ground for the adoption of the 5G!Drones results, mainly in standardization bodies documentations, and their final uptake by industry, verticals, and SMEs. The content will be adapted accordingly, but the main focus will remain on 5G!Drones activities, achievements, and results of use cases trials.

The main goal of 5G!Drones dissemination strategy is to create and spread awareness of the project and its results to the broadest possible audience within the scientific and research community. To reach this goal, 5G!Drones will differentiate between two major strands of communication and dissemination: The general promotion/communication activities, which will be focused on mainly in the first months of the project, targeting the wide public audience (mainly through the communication channels of the project), and a set of more specific activities, dissemination activities, dedicated to the presentation of 5G!Drones advances and outcomes to the scientific communities, academia, and industries (through dissemination means and showcasing events). These dissemination activities will become more

important as the project evolves and concrete results will become the focus of the dissemination plan/activities.

3.3. Means of Dissemination

3.3.1. Publications

5G!Drones partners plan to submit various papers for publication to conferences and journals aiming at the most efficient diffusion of project results to the scientific community.

The consortium will target publications, mainly focusing on the following topics/activities of the project:

- Publications of implemented architecture to describe general principles of the architecture, how architecture will support different use cases, and how KPIs are measured via architecture.
- Publications of the UC1: measured KPIs, validation results of the KPI's and other findings, related to using 5G and drones as a result of the use case trials.
- Publications of the UC2: measured KPIs, validation results of the KPI's and other findings, related to using 5G and drones as a result of the use case trials
- Publications of the UC3: measured KPIs, validation results of the KPI's and other findings, related to using 5G and drones as a result of the use case trials
- Publications of the UC4: measured KPIs, validation results of the KPI's and other findings, related to using 5G and drones as a result of the use case trials
- Publications of the recommendations for using 5G connectivity with drones, including limitations of the 5G and drone technologies.

3.3.2. Workshops

5G!Drones partners will participate and co-organize with other projects, various workshops at 5G and drone related events and conferences. As per the initial dissemination plan, four final workshops are estimated to be planned in Finland, Estonia, Poland, and Greece to disseminate the final results of the use cases, measured KPIs, and final recommendations of using 5G for drone connectivity.

3.3.3. Conferences

5G!Drones partners will participate in various conferences for maximizing the dissemination and impact of the project. An indicative list of potential conferences is presented below.

Consortium members will participate at the following vertical-oriented conferences:

- ITS World Congress 2019, Singapore
- Amsterdam drone week 2020/2021
- ICUAS 2020/ICUAS 2021

Consortium members will apply for a presenter of following communication related conferences:

- 5G Summit 2020/2021
- GSMA MWC Barcelona 2021
- EuCNC 2020/2021

3.3.4. Presentations

Consortium members will present 5GDrone projects and its objectives, architecture, preliminary experiences of pre-trials, and final findings of use cases in workshops and conferences mentioned in sections 3.3.2 and 3.3.3. In addition, 5G!Drones partners will use presentations as a dissemination means for promoting the objectives and achievements of 5G!Drones targeting at several events such as conferences, special sessions, workshops, info days, business days, forums etc.

3.3.5. Participation in Demonstration Events

A main focus point of 5G!Drones is the demonstration of its use cases and trials results to the wider community, including experts from industry, academia as well as audience with technical interests. Reaching out to drone manufacturers, and drone operators, 5G technology providers/operators, service providers from various verticals. Thus, to increase its visibility, showcase its capabilities in conducting various use cases and demonstrate its performance in assessing project's KPIs, 5G!Drones aim to be present in the major drone events and exhibitions of the mobile and drones industry sector. These events will be carefully selected not only based on their large number and variety of attendees, but also due to their worldwide geographical distribution, so that the maximum visibility, and thus, exploitation potential can be reached.

Specifically, regarding demonstrations in exhibitions and public events, the following events are initially targeted where the results of 5G!Drones will be demonstrated:

1. Amsterdam drone week 2021
2. GSMA MWC 2021

3.3.6. Other Dissemination Means and Channels

Consortium members will use intensively the 5G!Drones communication channels such as 5G!Drones website, Twitter, LinkedIn, YouTube, Instagram, and Facebook to communicate dissemination activities such as publications, presentations, showcasing events etc. Also, consortium members will use the same dissemination/communication channels for disseminating pre-trials and Use Case trial activities along with their results.

3.4. Targets of Dissemination and Showcasing Plan

3.4.1. Publication targets

The main publication target is 5G!Drones publications (defined in chapter 3.3.1) to be accepted in Journals and magazines on communications/networking (e.g. IEEE Communication Magazine, IEEE JSAC, IEEE Network, IEEE Internet of Things etc.), and in vertical-oriented publications (e.g. Journal of Unmanned Aerial Systems, International Journal of Intelligent Unmanned Systems etc.)

3.4.2. Workshop targets

The core workshop target is to arrange 5G!Drones related workshops in each four countries (Finland, Estonia, Poland, and Greece) as reported in Section 3.3.2. Workshops will be ½ to 1-day seminar to disseminate final results of Use Cases and recommendations of the use 5G for drone connectivity. Dissemination target is to gain understanding for the vertical audience, what are the opportunities, limitations and recommendation of using 5G for the drone connectivity. Dissemination target for communications audience is to communicate the market opportunity of the drone sector in

telecommunications, especially in 5G. An additional target that will be fulfilled through the workshops is to gain knowledge of the drone related needs of 5G configuration and optimization to ensure great service level for the drone connectivity

3.4.3. Conference targets

Conference target is partners to get accepted as speakers in at least three of the vertical-related conferences and one communications-related conference listed in Section 3.3.3. Objectives for the conferences are the same as the ones of the workshops: to disseminate the value/knowledge of the 5G connected drones and the existing limitations, as well as to highlight the 5G recommendations for attaining drone connectivity of good service quality.

3.5. Monitoring-Evaluation of Dissemination-Showcasing Activities and Plan

3.5.1. Online Repository

The 5G!Drones partners use the Microsoft Teams platform as a collaborative tool in order to share information relating to the project's tasks, prioritize work packages and remain intact and well organized to efficiently reproduce high quality outputs and activities. A special section is dedicated to dissemination and showcasing activities where partners upload material (papers, presentations, photos, videos) from events in which they participated.

3.5.2. WP5 Activities and Impact Tracking

An internal tool of Teams is exploited for monitoring dissemination and showcasing activities. It is a custom-made online Teams excel file, which is created, located and shared amongst partners via the Microsoft Teams platform under the WP5 folder. This file is used in order to monitor the dissemination and showcasing activities of each partner. Each partner is responsible for regularly updating the excel sheet and inform the rest of the partners in relation to the performed dissemination/showcasing activities (performed or upcoming). In specific, as soon as an activity is performed (the latest within 7 days), all related material should be upload to Teams and the excel file to be updated.

4. EXPLOITATION PLAN AND STANDARDIZATION ROADMAP

4.1. Introduction

5G!Drones aims at validating 5G KPIs to support several UAV use cases via trials using a 5G shared infrastructure, showing that 5G supports the performance requirements of UAV while allowing to run simultaneously several UAV applications with different characteristics (eMBB, uRLLC and mMTC). From obtained results, 5G!Drones will allow the UAV industry to make recommendations for further improvements on 5G standardisation. Each partner involved in 5G!Drones is key in the chain value and has its own exploitation plan that will be refined all through the project.

By using data analytics tools, each use case scenario will be carefully studied in terms of performance, aiming at drawing conclusions and recommendations to the 5G and UAV ecosystems. The feedback can be used as input to standardisation bodies, such as 3GPP or ETSI MEC, in order to optimise or update 5G standards for UAV.

Importantly, 5G!Drones will identify potential gaps and missing enablers in the 5G system so that the particular functional and performance requirements of the UAV vertical industry are met. These findings will be valuable feedback for ongoing standardisation activities in the context of the 5G system and architecture as a whole, and its enablers such as Multi-access Edge Computing and Network Slicing in particular.

The 5G!Drones project relies on a wide set of technological pillars such as NFV, SDN, MEC, Network Slicing and security in addition to UAV. Different standardisation activities (both ongoing and expected) are therefore anticipated to impact or to be impacted by 5G!Drones results.

In order to guarantee maximum impact, 5G!Drones will pursue a proactive approach in the project execution phase that consists of:

- Setting up the standardization and continuing to update the standardization activity roadmap as the work in the project and these SDOs progress.
- Coordinating the project and standardization groups through constant monitoring of activities and regular conference calls with standardization experts. The latter will be composed of standard experts from the 5G!Drones consortium.
- Seizing opportunities to push technology contributions into ongoing specifications.
- Coordinating with standardization experts to draft contributions ahead of standard meetings.
- Continuously promoting the project at standardization-related workshops, panel and summits.
- Regularly sync with 5G IA Pre-standardization WG.
- Link to 5G-PPP and interact with the rest 5G-PPP projects
- Participate in 5G-PPP, 5G IA and NetWorld2020 WGs
- Project partners by fully exploiting project’s achievements and outcomes through their own exploitation plans

4.2. Standardization Roadmap

4.2.1. Standardization Development Organization

Table 6 presents SDOs in which 5G!Drones partners participate and that could potentially benefit from 5GDRONES partners' contribution through project execution:

Table 6: SDOs

SDO	WG	Task	Partners	Action
3GPP	**TSG SA, RAN, CT**	Contribution and Alignment	AIR	Mission Critical Services in 5G
ASTM	**F38 UAS**	Contribution and Alignment	INV	Supplemental Data Providers Standards
GUTMA	**Aerial Connectivity**	Contribution and Alignment	INV	Determining the needs with regards to aerial connectivity
ETSI	**NFV, MEC, TC Cyber**	Contribution and Alignment	THA	Virtualization, edge computing, cybersecurity

4.2.2. Link to 5GPPP

5G!Drones as part of 5G-PPP Programme is committed to support activities at programmatic level. This will happen through participation to 5G PPP Steering Board and 5G PPP Technology Board where 5G!Drones will be represented respectively by project Coordinator (PC) and project Technical Manager (TM). But this will happen also in the context of 5G PPP or 5G IA Working Groups of interest for 5G!Drones where 5G!Drones project representatives would be appointed to join and contribute. This representation would be supported and defined by TM and communicated to selected WG chairs by PC.

The list of 5G Work groups is available at https://5g-ppp.eu/5g-ppp-work-groups/ with a short introduction to each of them. It also states the distinction between 5G IA and 5G PPP work groups. The former is open to 5G IA Members and representatives of ongoing 5G PPP project whereas the latter is open to representatives of ongoing 5G PPP projects. This, with the exception of the Trials WG, is also open to representatives from organisations that are not members of the 5G IA or beneficiaries of a 5G PPP project (upon approval by the Chairperson of the WG).

At the time this report is written the following representation has been defined and partners have started to be appointed and to team to represent 5G!Drones in the WGs of concerns.

Table 7: 5G!Drones planned representation at 5G WGs level

Working Group	Origin	5G!Drones
Pre-Standardization WG	5G Infrastructure Association	Y
Spectrum WG	5G Infrastructure Association	n/a
5G Architecture WG	5G-PPP Projects	Y
Software Networks WG	5G-PPP Projects	Y
Network Management & QoS WG	5G-PPP Projects	N (since stopped)
Vision and Societal Challenges WG	5G Infrastructure Association	Y
Security WG	5G Infrastructure Association	Y
SME WG	Networld2020	Y
Trials WG	5G Infrastructure Association	Y
5G Automotive WG	5G-PPP Projects	N
IMT-2020 Evaluation Group	5G Infrastructure Association	Y
Test, Measurement and KPIs Validation	5G-PPP Projects	Y

Table 7 shows the level of commitment that 5G!Drones has with respect the 5G PPP Programme, with participation envisaged to 9 out of the 12 WGs. This participation will be monitored on a regular basis by Technical Manager and adjusted whenever needed since interest maybe subject to overall performance of the considered WGs with respect to topics in scope of the project.

Engagement with relevant 5G-PPP working groups will be achieved in accordance to workplan and milestones they would have defined. Emphasis will be put on prioritising timely contributions and sharing knowledge across the 5G-PPP and relevant Work Groups.

Through participation to selected WGs, 5G!Drones will cross-fertilize on topics of shared concerns with other 5G-PPP projects of interest while providing insights on the work performed from its side. As other projects involved it will thus contribute to milestones of these WGs such as focused Whitepapers and or Workshops despite not uniquely.

In terms of 5G-PPP Projects 5G!Drones will engage with at first place we can quote the ICT17 Projects (5G-VINNI, 5G-EVE and 5GENESIS) but also ICT19 projects due to shared concerns these projects have with respect to the effective and efficient usage of the 5G platforms (aka ICT17 projects). Last but not least 5G!Drones will also leverage on relevant outcomes of previous 5G-PPP phases (especially Phase II) and liaise with supporting projects (i.e. CSA) that apply at 5G-PPP Programme level (Euro5G, Global5G and Full5G).

4.3. Exploitation Plan

Exploitation activities correspond to actions that expand the reach of the project results towards a long-lasting impact in the form of new products/services that have an impact to the society. Below we present the exploitation plan for each 5G!Drones project partner:

Table 8: 5G!Drones exploitation plans

Partner	Exploitation plan
UO	The UO exploitation plans for 5G!Drones include: • Showcasing 5G!Drones verticals and results at key events. As the Coordinator of the project UO gives presentations in several events promoted by the European Commission. • Promotion of the project by target workshops at key conferences. • Promotion of 5G!Drones use of ICT-17 test facilities and the UO open 5G Test Network Partner facility ecosystem and beyond, aimed at rapid business development, www.5gtn.fi. • Promotion of the project results via the Finnish 6G Flagship Programme, www.6genesis.org. • Exploitation after the project includes: • The 5G!Drones project results will actively be shared within the industrial consortium partners beyond H2020 realm. • The UO support facility will remain available as a significant part of the 5GTN (5G Test Network) for increasing visibility and market uptake of the project outcomes. The 5GTN will also evolve towards 6th Generation facility via the National Flagship program 6Genesis related activities. UO plans to introduce its assets to operational production network at the university and also for educational purposes especially in ICT related but also in multi-disciplinary fashion between all faculties in UO.
COS	COSMOTE, as leading mobile network operator, not only provides its customers with the most technologically advanced solutions but also utilizes advanced tools/procedures for internal operations. In this context, the project is expected to provide valuable products and results that are of potential interest for COSMOTE (and DT Group) in view of the 5G era. By using the know-how as well as the technologies and products developed in this project, COSMOTE will have the opportunity to investigate potential uses of UAVs in its mobile network to reduce OPEX and increase revenues from the early adoption of 5G, as well as to provide fast and easy communication solutions in cases of emergency situations contributing to public safety and protection. Indicative exploitation scenarios:

	• Disaster recovery and emergency communications: UAVs could provide telecommunications services in case of a disaster including earthquakes, wildfires, floods, etc. In these cases, UAVs equipped with 4G/ 5G base stations could offer short-term telecommunications services to first responders and general public in the geographical areas impacted by the disaster. In emergency situations e.g., where people are found in danger, UAVs –carrying a base station- could provide short-term cellular coverage by relaying the signal to the core mobile network infrastructure. • Cellular tower inspections and/or actions: Conventional tower inspection, that involves tower climbing by the mobile operator employees or a 3rd company, apart from the effort and cost required, it has been recognised as one of the most hazardous jobs in the world. Alternatively, UAVs can be used to conduct tower inspections, capturing and transmitting in real-time pictures & video to COSMOTE's operation and maintenance facilities. In addition to not risking lives, UAVs can carry out routine audits and inspections faster and more effectively producing more reliable data, allowing instant analysis. On top of inspection, UAVs could be also utilised for melting ice e.g. from MW antennas by throwing water that the UAV could carry in buckets or bring from the earth up to the antenna via an elastic tube. • Radio network planning: UAVs could be used for radio planning, since they can be very effectively used to determine the ideal location and height for new antenna locations. In this case, expensive on-site visits by COSMOTE employees may be substituted by UAV surveys. • Ad-hoc capacity increase: UAVs equipped with 5G base stations could provide additional capacity in cases of crowded events (including festivals, large stadiums, demonstrations, traffic jams, etc.). This in turn will result in data usage increase. • Facilitation of early 5G technology adoption: UAVs equipped with 5G base stations could provide 5G services in hotspots where a 5G antenna has not been installed yet, therefore contributing to the early adoption of 5G. Finally, the dissemination of the project results within the Deutsche Telecom (DT) Group, in which COSMOTE is part of, will allow for the exploitation and reuse by other telecommunication companies as well, in the future.
THA	THALES will exploit the results of 5G!Drone to enrich the commercial offer of its 4G/5G line products, in particular TWS 8100 (LTE UE with Wi-Fi capability) and TWS 8300 (LTE eNodeB with local EPC) and their extension to better address public safety markets. The results will be used as a new building block for the THALES security core reference platform. In a second step after the end of the project, THALES will extend its business plan to target public administration and private sector such as oil industries and other critical infrastructures inspection. According to "Public Safety LTE & Mobile Broadband Market: 2015 – 2030 – Opportunities, Challenges, Strategies & Forecasts" report, public safety LTE infrastructure investments should grow at a CAGR of nearly 40% between 2015 and 2020. By the end of 2020, infrastructure investments which include base stations (eNBs), mobile core and mobile backhaul gear will account for over $2 Billion. The market for ruggedised public safety LTE devices will also witness significant growth, with an estimated 4 Million annual device shipments in 2020.

	THALES aims to capture around 5% of these markets by 2020 through the execution of projects such as 5G!Drone with new product differentiators.
AIR	5G!Drones outcomes will allow Airbus DS SLC to demonstrate that 5G network slicing technology will further enable Public Safety users with rich and reliable multimedia services and applications, as part of the PMR industry evolution to 5G Broadband. Airbus DS SLC expects developing concrete innovative 5G use cases – involving drones in this project – allowing public safety users to project themselves in new usages for innovative devices, how exploiting these new capabilities and showing the readiness of Airbus secured communications products to support this technology ensuring performances in accordance with public safety requirements. The project outputs will nurture Airbus DS SLC products and solutions roadmap to build a competitive portfolio and to maintain its leadership in the PMR industry.
INV	INVOLI's exploitation plan includes showcasing the use of 5G as the next generation framework for drone applications and especially understanding its impact on drone flight awareness, on live air traffic data transmission in crowded sky and on UTM services. Projects tests will allow to understand the links between INVOLI infrastructure and ICT-17 test facilities, to understand how the current telecom infrastructure which INVOLI uses could be extended towards 5G (many partners with whom INVOLI works in the telecom industry have already pledged to extend their network to 5G). The project outputs will support clear and profitable business model in the 5G & drone field, and how they can be enhanced with the new technological advances offered by 5G, and tested within this 5G!Drones project. 5G will finally permit sending live streams of data to the drone regarding the whole air traffic around, thus requiring a large amount of data sent with the lowest latency possible. This will finally permit unparalleled flight awareness for our clients with a never-seen-before security regarding potential collisions in the sky. Those new 5G capabilities will be crucial in establishing a strong and scalable business model for drone development and future applications. Project outputs will also nurture INVOLI products, credibility and viability on the long-term.
HEP	Hepta Airborne will use the 5G!Drones project to help develop its Hepta FX-20 drone and data analyzing services in regard to using the possibilities 5G network has to offer. Our trial will help understand how 5G can change power line inspection as a service and lay the foundation for more efficient solutions.
ORA	Orange ambition is to take part in the UAV ecosystem as a major actor thanks to 5G connectivity improvements. Orange aims to enrich its 5G offers in order to improve connectivity for UAV (B2C offers) and therefore to address specific UAV requirements of vertical clients among several (B2B2C offers). The project results will be exploited for integrating 5G adaptations into Orange future commercial networks, in particular, network slices and radio planning for improving UAV connectivity. Orange as a member of several standardisation organisation bodies, will contribute to disseminate projects assessments in standardisation. Orange will contribute to develop concrete innovative 5G use cases, in particular the role of 5G slices in UAV Traffic Management and Connectivity Extension. A particular attention will be also paid to applying the use

	cases in different continents, industrialised countries but also developing countries.
OPL	Orange Polska expects that UAV related services will boom in the next five years. Such services may have specific requirements related to the communication with UAVs as well as need some service-related enablers that can be provided by the mobile network operator. Therefore, we want to gather requirements related to the communication link properties that are used for UAV control and sending gathered by UAV information (video streaming, audio streaming, and telemetry data transmission). The information can deal with link bitrate, link delay or connectivity reliability. As 5G network (the Standalone version) provides support for network slicing we want to identify which slice types and their properties are needed for UAV handling. It is expected that for UAV control an uRLLC slice will be needed, for multimedia streaming the eMBB slice can be used, for telemetry mMTC slice is needed. The UAV services need multiple slicing, and the problem of slice grouping for a composite service has not been yet addressed well. Other issues that have to be solved yet and are addressed by the 5G!Drones project include proper radio coverage, mobility management, network support for UAV localization and using of ProSe services (direct device-to-device communication) for UAV swarms. In general, we want to evaluate how the existing 5G mechanism can support UAV services and, if necessary, will contribute to 3GPP Release 17 recommendations on UAV services in 5G networks (the work is ongoing).
CAF	CAFA Tech will exploit it work (with 5G!Drones project) through CAFA Tech website and social media accounts. Also CAFA Tech share experiences and information about activities through 5G!Drones social media accounts and website and presentations on 5G related seminars.
ALE	Alerion develops smart custom drones for specific applications. Alerion is involved in different projects in which it creates solutions for infrastructure inspection, environmental surveillance, and broadcasting events. With the upcoming era of 5G, Alerion is willing to use the results of this project to upgrade its offer and explore new possibilities and markets: • Using 5G capabilities to enhance Alerion drones – Especially, we would like to equip our Hydradrones to explore a new usage of our technology. The goal is to diversify our product for different kind of users. With 5G enabled on our Hydradrones, we could cover larger areas and propose more efficient autonomous monitoring services. • Answering new needs with 5G drones and reach new markets and customers – The possibilities offered by 5G are an opportunity to develop Alerion's business. Also, Alerion is already working
NOK	The Nokia exploitation plans for 5G!Drones project include: • Promote 5G potential and vertical business opportunities like UAV on top of 5G. • Help communications service providers (CSP) to utilize 5G possibilities and reduce their OPEX by using UAV in 5G Base Station (BTS) RF performance planning validation or telecommunication equipment inspection.

	• Use Virtual Reality and telepresence as on option to manage Nokia Drone. Exploitation after the project includes usage of the 5G!Drones projects results in • Future 5G development activities • Various standard groups like 3GPP, ETSI etc. impacting new 5G standard releases to support coming UAV business needs • Further development of Nokia Drones • Building ecosystems around the ICT-17 test facilities, the UOULU open 5G Test Network Partner facility and the X-Networks with Aalto for 5G vertical business development.
RXB	Robots.Expert, has been helping organizations to exploit new drone technology in their business. Its exploitation plans for 5G!Drones include: • Promotion of 5G!Drones in Robots.Expert partner network in Europe and in Finnish drone ecosystem. • Showcasing of 5G!Drones trials and results in related events. • Promoting the 5G test networks for drone industry across Europe and worldwide.
UMS	The capability of Unmanned Systems Limited's software platform to control and manage a swarm of different robots (aerial and ground) autonomously allows it to cater to a wide range of customers. With the integration of 5G connectivity in its drones, UMS is looking forward to solving previously unsolvable challenges of its customers. With the 5G!Drones project, UMS would like to explore the following possibilities: • To demonstrate using in-field trials how 5G in conjunction with our software platform will enable mission critical use cases using multiple autonomous UAVs. • To demonstrate the need for 5G to enable a swarm of autonomous UAVs to conduct different tasks (e.g. providing medical supplies, last-mile connectivity, video transmission, thermal imaging, etc.) simultaneously. • To work in collaboration with industry partners and establish viable business models for 5G-enabled autonomous UAV-based use cases for vertical industries. • To demonstrate the capabilities of our 5G-ready Autonomy-enabling software platform in an operational environment. • To showcase how the European 5G-driven UAV technology is laying the foundation for a hyper- connected future society.
DRR	Droneradar's exploitation plan is the implementation of 5G technology to the next generation of UTM and DTM systems. High level objective is focused on the definition and test implementation of UTM provisioning profiles which will allow UTM operator to become a network services provider. Network slicing, network planning and NFV will be used as the foundation of next generation U-space

	services. The uniqueness of the solution will concentrate on Risk (SORA) and Performance based (PBN) analyses. The unique characteristics of present and future 5G solutions will allow for the creation and delivery of functionalities that are not possible to implement using current network technology. The key value proposition would be using the URLLC, eMBB and mMTC of 5G networks to facilitate dependable, low latency, high bandwidth on-line communication between Unmanned Aerial Vehicles and airspace control centers in a variety of possible legislative and business models. Coupled with UTM system management these capabilities would allow for the implementation of agile service provisioning in a broad variety of situations, ranging from in-flight UAV status changes to communications prioritization in designated airspace. The knowledge and experience gained through the outcomes of the 5G!Drones project will effectively serve Droneradar in building a competitive market position both in delivering innovative products and consulting services to the market, based on an integrated UTM and 5G environment. Since Droneradar closely cooperates with Poland's CAA, ANSP and various Ministerial levels, the experience obtained from the 5G!Drones project will also serve to solicit future business and legislative models to these entities.
INF	INFOLYSIS's exploitation plan for 5G!Drones include: • The conduction of a thorough business model/market analysis which will aim at the identification of the market towards which 5G!Drones is targeted, its segmentation, the positioning of current competitors and all corresponding emerging trends and key players, • The analytical definition and evaluation of the sustainability and viability of possible business models and alternative solutions that may be followed for the provision of the project solution and services to the identified stakeholders, including pricing, licensing etc., • 5G!Drones techno-economic analysis aiming at the verification of financial viability of the proposed business model. According to the marketing plan of INFOLYSIS, there is special interest on the 5G extension in the shipping market, focusing mainly on area surveillance by drones, IoT on vessels, as well as massive IoT opportunities over 5G. Therefore, through the participation in 5G!Drones and the performed business and financial analysis, INF will gain a valuable 5G know-how and obtain a significant competitive advantage in the forthcoming 5G market. The project outputs will benefit and further evolve INF products and services resulting to a competitive and innovative portfolio of 5G, IoT and chatbot apps.
EUR	EURECOM will exploit the work within 5G!Drones via its academic activities, strengthening its scientific and technical expertise in cutting edge research areas in which it is already very active, such as software defined communication systems, cloud computing and NFV, mobile communication systems, network slicing and softwarization, and edge computing, but also extending its know-how with respect to the UAV vertical industry. EURECOM's participation in 5G!Drones will allow it to channel this knowledge to its M.Sc. and Ph.D. programs, preparing its students and interns for work in advanced science and technology sectors and giving them the opportunity to carry out timely research. Moreover,

	5G!Drones will contribute to OpenAirInterface and other related software projects EURECOM is leading, such as its Network Slicing and Multi-Access Edge Computing platforms, and will give the opportunity to test them in large-scale trials, increasing both their quality and visibility. EURECOM will also exploit the selection of the Sophia Antipolis site of the ICT-17 5G-EVE facility for 5G!Drones trials, enhancing the functionality of the facility to meet the needs of the UAV industry, and ensuring the utility of the platform well-beyond the end of the 5G-EVE project. Finally, the activities in the context of 5G!Drones will help EURECOM strengthen its ties within the consortium and the relevant (vertical and other) technological sectors at large, fostering future collaborations with top-level academic and industrial partners.
NCSRD	DEMOKRITOS sees the participation in 5G!Drones as a clear step towards the establishment of a high research and scientific status in the area of future network architectures and management systems. 5G!Drones will be the vehicle to build on the experience and excellence on novel 5G network infrastructures and respective technologies (software networks, monitoring and management) acquired by the participation of DEMOKRITOS in numerous EU funded projects as well as the strategic research interests as defined by the Centre. DEMOKRITOS will make use of 5G!Drones results in its research activities and in introducing new topics for PhD theses and dissertations for new graduate students interested to deepen the knowledge on the main issues addressed by the project. In addition, DEMOKRITOS hosts the Technological park of "Lefkipos" - in which several private companies in the field of IT and Telecommunications are established and the results of the various vertical industries tests will be further promoted and exploited with potential synergies and joint ventures. Therefore, 5G!Drones results will be disseminated to those companies with the objective to establish mutually beneficial collaborations and transfer obtained knowledge. Market exploitation of possible value-added outcomes and foreground knowledge will be considered.
AU	AU will exploit the main findings and outputs arising from 5G!Drones to strengthening its research and technical expertise in different fields related to UAVs and 5G. As an academic institution, AU is aiming to enrich its teaching activities at different levels. Incorporating different technological aspects of the project in the teaching content will allow exposing students to real-world technologies. The project results will be also exploited as a catalyser for further research projects in relevant scientific and technological areas. Moreover, AU will leverage the research findings from 5G!Drones to continuously evolve its network facility. In addition to ICT-17 facilities, 5G!Drones will make use of the X-Network trial site of AU. The testbed is part of the Finnish national project 5GTNF (5G Test Network Finland), which is an evolving ecosystem supporting 5G and beyond technology research and validation. The site will be refined to cover drone use cases.
MOE	Municipality of Egaleo through the participation to 5G!Drones will have the opportunity to offer to Egaleo citizens the 5G experience significantly before its market release. The advances that will take place at Egaleo stadium will be further exploited for the development of novel services for the citizens. Municipality of Egaleo will try to exploit the capabilities that will be made available during and after the end of this project in order to drive development of community impacting applications and services. This will be working closely with the local community and companies.

FRQ	Frequentis will use the 5G!Drones project to expand its portfolio with respect to Flight Information Management Systems for UAVs. The integration of Frequentis products in 5G!Drones trials will help to build a better marketing visibility and gain deeper insights by sharing experiences and valuable know-how between the Consortium members. Other objectives include generating awareness for the current Frequentis UAV product portfolio among the stakeholders, creating an efficient business model, and establishing a product roadmap based on the trials output. As innovation leader, Frequentis strives to achieve a technical progress with respect to 5G networks.

5. CONCLUSION

This document presented and analysed the initial WP5 plans and strategies of 5G!Drones project and in specific the communication plan, dissemination and showcasing plan, exploitation plan and standardization roadmap. Plans and strategies presented in this document will be applied throughout the entire life-cycle of the project and will be regularly updated/revised, if required, as per the upcoming new needs and requirements of the project. Any future revision in plans and strategies will be described in detail in the upcoming WP5 related deliverables.