



**5TH GENERATION END-TO-END NETWORK, EXPERIMENTATION,
SYSTEM INTEGRATION, AND SHOWCASING**

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Deliverable D7.4

Dissemination, communication and ecosystem engagement activities report (Release C)

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LIST OF ACRONYMS

Acronym	Meaning
3GPP	Third Generation Partnership Project
5G PPP	5G Infrastructure Public Private Partnership
CfP	Call for Papers
DoA	Description of Action
Dx.y	Deliverable No y of Work Package x
GA	General Assembly
ICT	Information and Communication Technologies
KoM	Kick off Meeting
KPI	Key Performance Indicators
Mx	Month x
SDO	Standards Development Organisation
Tx.y	Task No y of Work Package x
WG	Working Group
WP	Work Package

EXECUTIVE SUMMARY

This deliverable documents 5GENESIS dissemination and communication activities, demonstrations and project's interaction with the 5G-PPP WGs and synergies with other 5G-PPP research projects during the third period of 5GENESIS lifetime (July 2020 – December 2021). The deliverable details in depth and compares the performed activities to the targets and Key Performance Indicators (KPI) of the third period established by the 5GENESIS impact plans, which were prepared during the project's first months and reported in D7.1.

In addition, total statistics, KPIs and overall impact outcomes are also summarized and presented for the full project lifetime (July 2018 - December 2021) showing that not only all set goals have been met, but also that most of the quantitative impact KPIs have been well exceeded.

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1. INTRODUCTION

1.1. Purpose of the Document

The scope of D7.4, the final release of the dissemination, communication and ecosystem engagement activities deliverable, is to present, analyse and evaluate the 5GENESIS dissemination and communication activities, demonstrations, interactions and collaborations with the 5G-PPP Programme and related H2020 research projects, specifically the 5G-PPP projects, during the third, and final, period of 5GENESIS lifetime (July 2020 – December 2021).

1.2. Structure of the Document

The document is composed of the following sections:

- **Section 1** introduces the purpose of this document, its structure and its target audience.
- **Section 2** presents the dissemination and communication channels of 5GENESIS, reporting briefly on the quantitative figures/KPIs achieved in Period 3 of the project.
- **Section 3** presents the means for coordinating, controlling, and monitoring the outreach activities of the project.
- **Section 4** lists in detail all the communication, dissemination and demonstration activities which have been performed by the 5GENESIS partners in Period 3. Results and performances are statistically evaluated against the Period 3 initial plan and targeted KPIs, while overall results during the entire project lifetime (July 2018 - December 2021) are briefly summarised.
- **Section 5** refers to the collaborations with 5G-PPP, including the Working Groups (WG) and other 5G-PPP projects with focus on the contributions and interactions made during Period 3 of the project.
- **Section 6** provides concluding remarks
- **Annexes 1-3** are used in order to present in detail the monthly statistical dashboards of the 5GENESIS social media and website, as well as the 5GENESIS newsletter issues published during Period 3 of the project.

1.3. Target Audience

Dissemination, demonstration and collaboration activities are performed by all the partners and differ in regard to the nature of the partner, the phase of the project, as well as the target audience. More specifically, the industrial partners approach industry sectors and their distributors as well as customers networks, whereas the academic and research partners target relevant other research institutes and universities, and students. In detail, the target audience of D7.4 is the following:

- **Industry:** Any group which has an industrial professional background, technical knowledge and expertise, and is working on 5G-related areas. In this group producers, suppliers, vendors, customers, and SMEs are involved.
- **Academia and research institutions:** Institutions from the ICT sector, higher education institutions like universities and educational centres as well as national, public and private research institutes; students.

- **Public and private service providers:** This category focuses on any 4G/5G services, verticals, network operators which are already planning or undertaking adaptations for evolving towards 5G and beyond systems.
- **5GENESIS consortium partners and 5G-PPP:** All colleagues, students, fellow professors, and researchers tightly related to the personnel working in the 5GENESIS consortium and consortia of rest 5G-PPP research projects and members of 5G-PPP (and other associations') WGs.
- **The broadest possible (technical and non-technical) audience:** All potential end-users of the 5G products and services as well as the general public.

2. MEANS OF OUTREACH ACTIVITIES – PERIOD 3

2.1. Communication Channels

The tools, the dissemination and communication channels, already established and used during the first and the second period of 5GENESIS, have been maintained throughout Period 3, while their use has been further intensified. The network of channels and means, which has been also used during the third period for promoting/performing the dissemination and communication activities of 5GENESIS are listed below and updates on their status are provided in the following sections:

- 5GENESIS logo
- 5GENESIS website
- 5GENESIS social media channels
- 5GENESIS newsletter
- 5GENESIS publications in journals, conferences, workshops, poster sessions
- 5GENESIS workshops, special sessions, panels, invited talks
- 5GENESIS presentations
- 5GENESIS demonstrations
- Other means and channels (such as leaflets, posters, interviews, innovation workshops, webinars, “Info Days” events, booths, poster sessions, award ceremonies, etc.).

2.1.1. 5GENESIS Website

The 5GENESIS website (www.5genesis.eu) remains the main channel of disseminating and communicating the project’s activities, news, results and achievements. The 5GENESIS website is constantly updated with news, events, deliverables, and dissemination activities such as publications, presentations, workshops, articles, etc. As mentioned in the previous releases of the dissemination and communication deliverable (D7.1/D7.2/D7.3), the website’s lifespan is planned to run until two years after project completion. The website’s main menu contents have been further elaborated since the start of the project. In specific, during the last period, the main menu (Figure 1) is composed by the following options: Home, Platforms, Consortium, Objectives, News, Publications-Dissemination, and Contact.

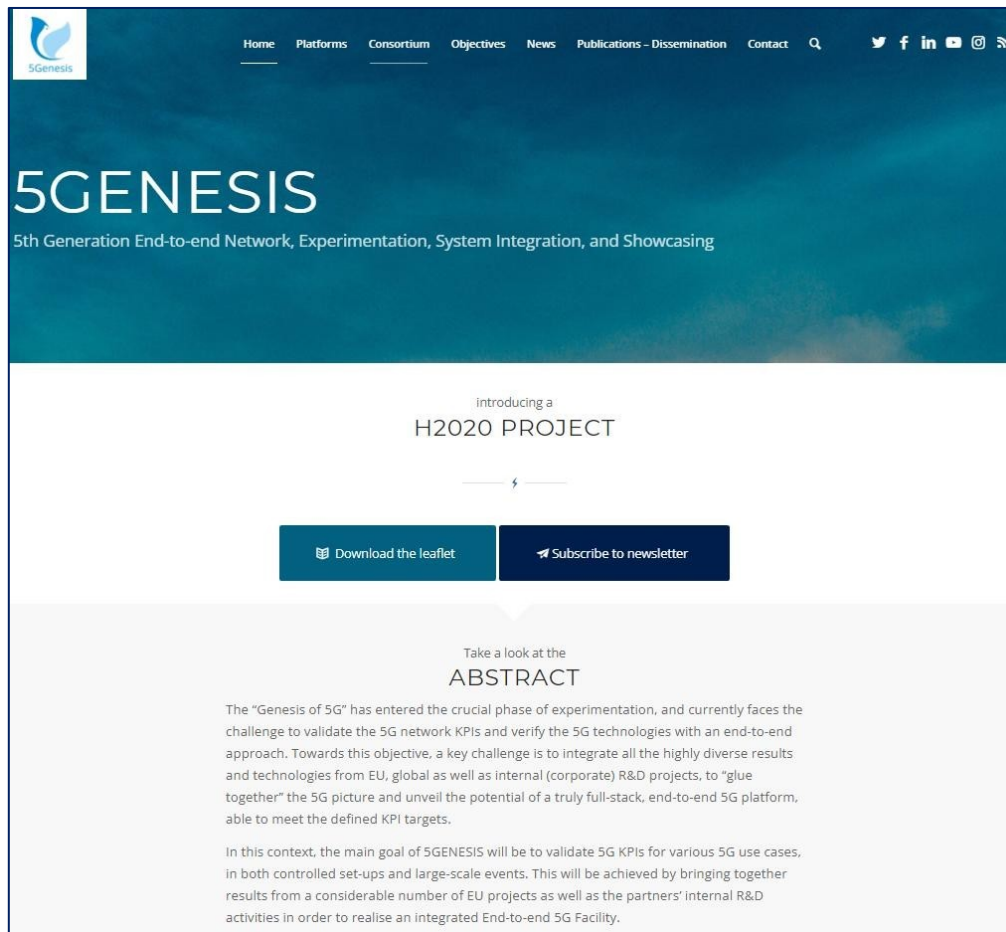


Figure 1. 5GENESIS Website

2.1.1.1. Core Website pages – Constantly Updated

The 5GENESIS website includes sections that are updated on a daily/weekly basis. These sections/pages are mainly the following (without excluding period updates in other pages too, as the project progressed and results accumulated): news, research papers, published articles, presentations, newsletter issues, workshops, events, demonstrations and deliverables. The following bullets present a detailed description of some of the aforementioned webpages.

- **News** (<https://5genesis.eu/news/>): Since the project start, this page has been constantly updated with the project's activities and achievements. This section has been used to communicate briefly research papers, publications, deliverables, workshops, presentations, demonstrations as well as interesting news/articles regarding 5G-PPP, interactivity with other research projects, General Assembly (GA) meetings etc. **During the third period of the project, 108 news posts have been added reaching a total of 242 posts on this webpage.**

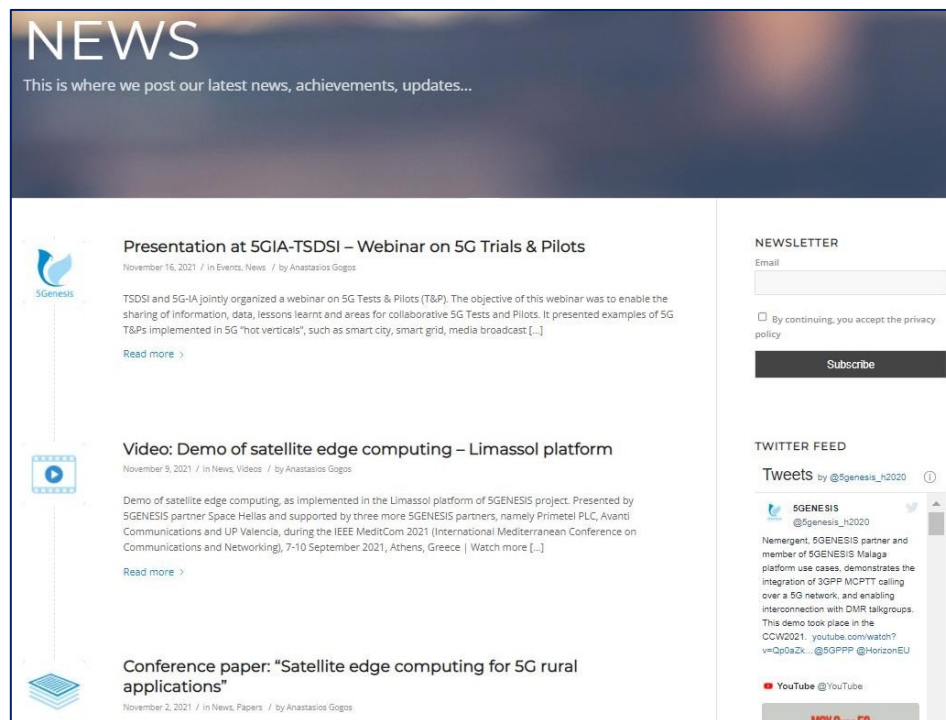


Figure 2. 5GENESIS News Webpage

- **Research Papers** (<https://5genesis.eu/research-papers/>): This webpage hosts the majority of 5GENESIS publications. In detail, research papers that have been published in journals, conferences, workshops, and white papers can be accessed through this page. Each documented activity includes the paper's publication date, the event/location where the paper was presented, a link that can be used to access the paper, as well as DOI information and the corresponding URL. **During the third period, 30 research papers in journals, conferences, workshops, 1 book chapter and 11 white papers have been recorded on this webpage.** More details in Section 4.2.



Figure 3. 5GENESIS Research Papers

- **Published Articles** (<https://5genesis.eu/published-articles/>): Online articles, related to project's and partners' activities, published in websites, online magazines, newspapers or various other online sources are provided on this webpage. These articles are available for online access or download (depending on their format) by clicking on a respective link. **During the third period, 18 online articles have been recorded on this webpage.** More details in Section 4.2.3.

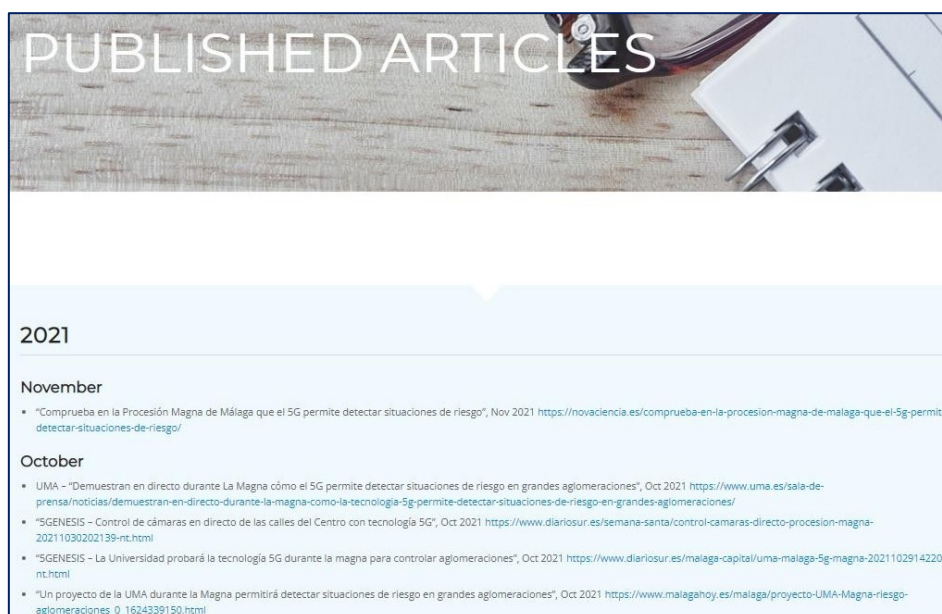


Figure 4. 5GENESIS Articles

- **Presentations** (<https://5genesis.eu/presentations/>): This page includes a list of presentation activities in which the 5GENESIS partners have participated. The majority of the presentations took place in conferences, workshops, training sessions, webinars and other events. **During the third period, 24 presentations have been made and recorded on this webpage.** More details in Section 4.2.6.

PRESENTATIONS


5GENESIS Presentations

5GENESIS partners have participated in various events in order to promote 5GENESIS through presentations. The table below summarizes all presentations made by 5GENESIS in conferences, workshops, special sessions and info days.

EVENT	DATE/LOCATION	TITLE
1. EuCNC 2018	18-21/06/2018, Ljubljana, Slovenia	5GENESIS presentation
2. EuCNC 2018	18-21/06/2018, Ljubljana, Slovenia	Presentation of economic aspects of 5GENESIS

Figure 5. 5GENESIS Presentations

- **Deliverables** (<https://5genesis.eu/deliverables/>): The Deliverables webpage acts as a means to monitor and evaluate the project's process. This page contains a list that gives a clear picture about the deliverables throughout project's lifespan. The list is being regularly updated in order to keep up with the project's progress. Once the deliverables are submitted to the EC portal, the page is properly updated, and the visitors and reviewers can access them through the respective links. **All the third period public deliverables have been made available for downloading.**



Del. No	Deliverable name	WP	Leader	Type	Dissem. level	Delivery date	Download
D1.1	Project management handbook	1	NCSRD	R[1]	C[2]	M3	
D1.2/1.3/1.4	Legal aspects and data management	1	INF	R	C/C/C	M3/18/42	
D1.5/1.6/1.7	Report on Project cumulative Expenditure	1	NCSRD	R	C/C/C	M6/M18/M30	
D2.1	Requirements of the facility	2	COS	R	P[3]	M4	PDF
D2.2	Initial overall facility design and specifications	2	LMI	R	P	M5	PDF
D2.3	Initial planning of tests and experimentation	2	UMA	R	P	M6	PDF

Figure 6. 5GENESIS Deliverables

- **Newsletters** (<https://5genesis.eu/category/newsletter/>): This page lists all the newsletter issues that have been published so far. The newsletter issues are published quarterly and are available online as per their release. 5GENESIS has communicated the newest newsletter versions with the subscribers mailing list and through its social media channels. **During the third period, 6 newsletters issues have been released and made available to the public through this webpage.**

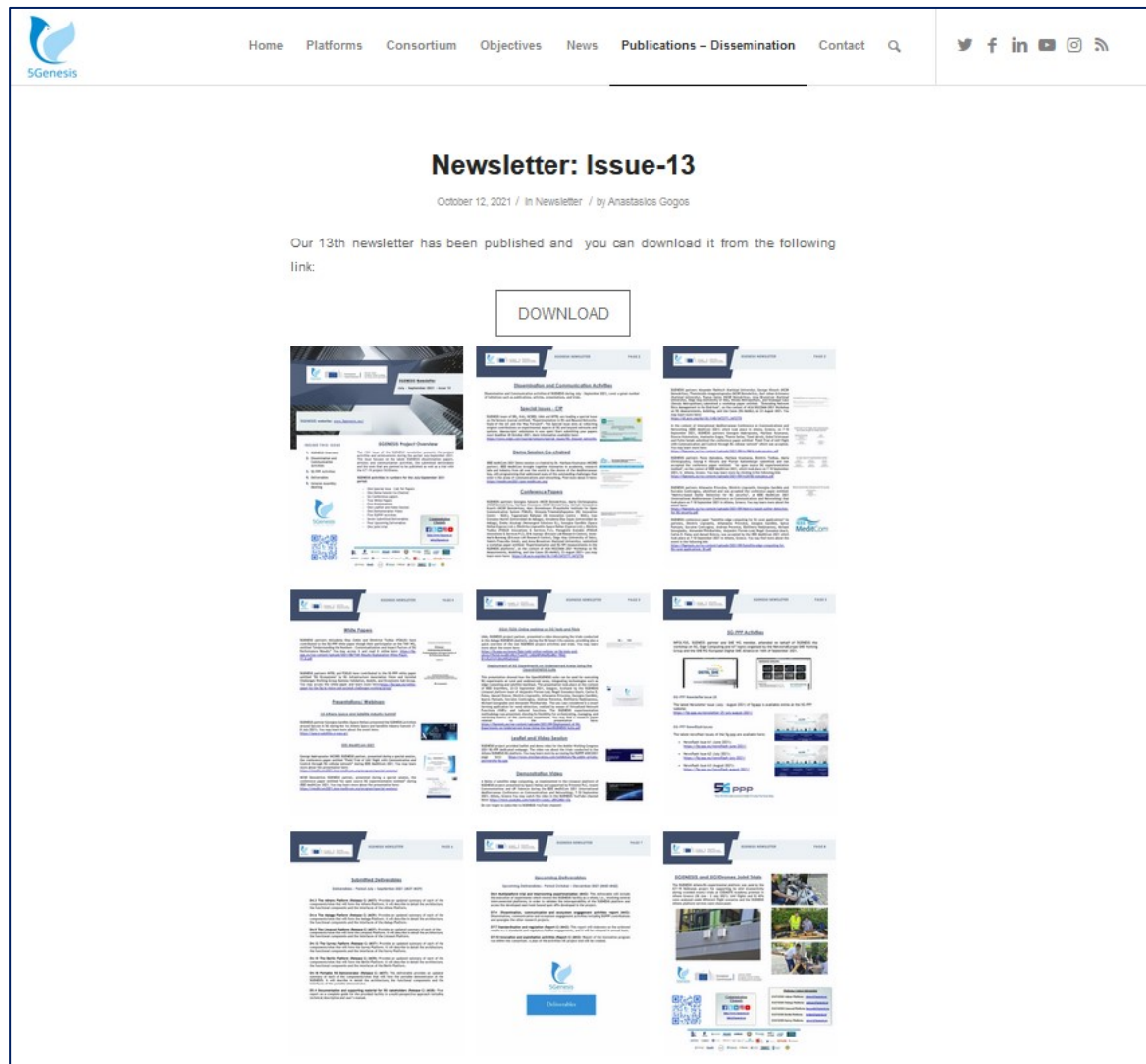



Figure 7. 5GENESIS Newsletter - Issue 13

- **Workshops** (<https://5genesis.eu/5genesis-workshops/>): This webpage contains information about workshops that 5GENESIS participated in, organized, or co-organized with other projects. **11 workshops listed during the period July 2020 - December 2021 and all related information is available through this webpage.** More details on the workshops also available at Section 4.2.5.



5GENESIS WORKSHOPS

Workshops, Conferences & Special Sessions

5GENESIS organizes/co-organizes workshops (together with other EU projects) in order to promote 5GENESIS achievements and results. The table below summarizes the 5GENESIS workshops so far.

EVENT	DATE/LOCATION	WORKSHOP/SPECIAL SESSION NAME
1. FUSECO Fokus	14-15/11/2018, Berlin	Architectures and Radio Technologies for 5G Transport- and Access Networks
2. WCNC 2019	15/04/2019, Marrakech, Morocco	Satellite-terrestrial interworking: a pillar of forthcoming 5G systems
3. WCNC 2019	15/04/2019, Marrakech, Morocco	2nd Workshop on Economics and Adoption of Millimeter Wave Technology in Future Networks
4. TMA Conference 2019	17/06/2019, Paris, France	3rd Workshop on Mobile Network Measurement (MNM'19)
5. EUCNC 2019	17-21/06/2019, Valencia	Business models and techno-economic analysis for 5G networks
6. EUCNC 2019	17-21/06/2019, Valencia	Validating and demonstrating the Satellite Integration into 5G

Figure 8. 5GENESIS Workshops

- **Events** (<https://5genesis.eu/events/>): In this webpage visitors may find information regarding past events in which 5GENESIS partners have been involved. The events are listed with descending order, starting from the latest to the most recent event. **More than 30 events were attended and have been added on this page during the third period.**

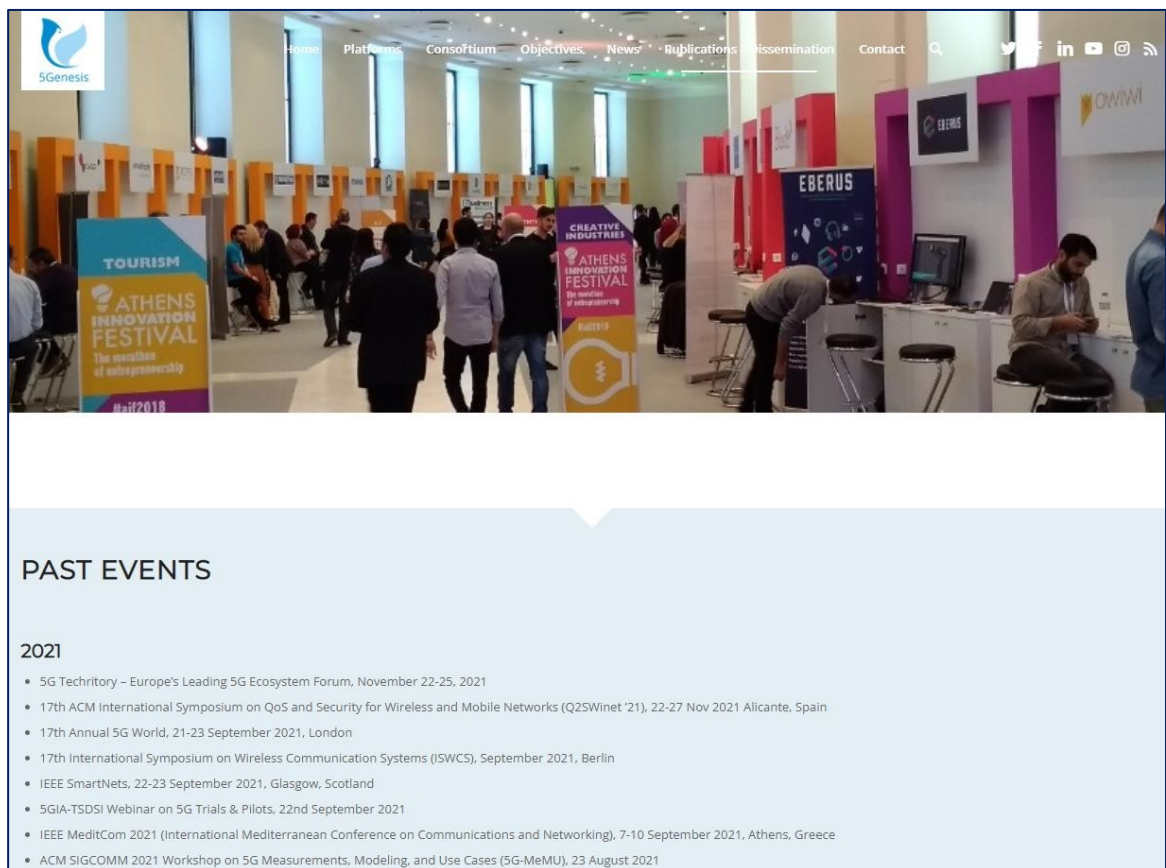


Figure 9. 5GENESIS Events

2.1.2. 5GENESIS Social Media Channels

5GENESIS, since its beginning back in 2018, has always been well presented in the most important and impactful social media channels such as Facebook, Twitter, LinkedIn, Instagram and YouTube. These social media channels, through 5GENESIS dedicated accounts, regularly have communicated activities in which the 5GENESIS partners participated and the main achieved results of the project. Social media channels play an important role in 5GENESIS impact activities as the project's initiatives and achievements have been constantly promoted to a wider audience. Additionally, social media channels have helped the project to reach the maximum visibility and be more impactful, by targeting the widest possible technical and non-technical audiences.

A clear differentiation exists to the target audiences of each channel, since specific ones (such as LinkedIn, Twitter) are used for targeting scientific, technical and academic audience, while other channels have been used for targeting a wider, less technical, audience. Table 1 provides each 5GENESIS social media channel account details along with its URL link.

Social Media Channel	Link
Facebook	https://www.facebook.com/5genesis
Twitter	https://twitter.com/5genesis_h2020
LinkedIn	https://www.linkedin.com/in/5genesis-h2020/

Instagram	https://www.instagram.com/5genesis_h2020/
YouTube	https://www.youtube.com/channel/UCrT3GgwTi3nGiHLWmKUkxug

Table 1: Social Media Channels

In what follows, the latest visual depiction of each social media channel is also provided along with its 5GENESIS channel name (@) and link.

- 5GENESIS Facebook account “@5genesis”: www.facebook.com/5genesis



Figure 10. 5GENESIS Facebook page

- 5GENESIS Twitter account “@5genesis_h2020”: www.twitter.com/5genesis_h2020

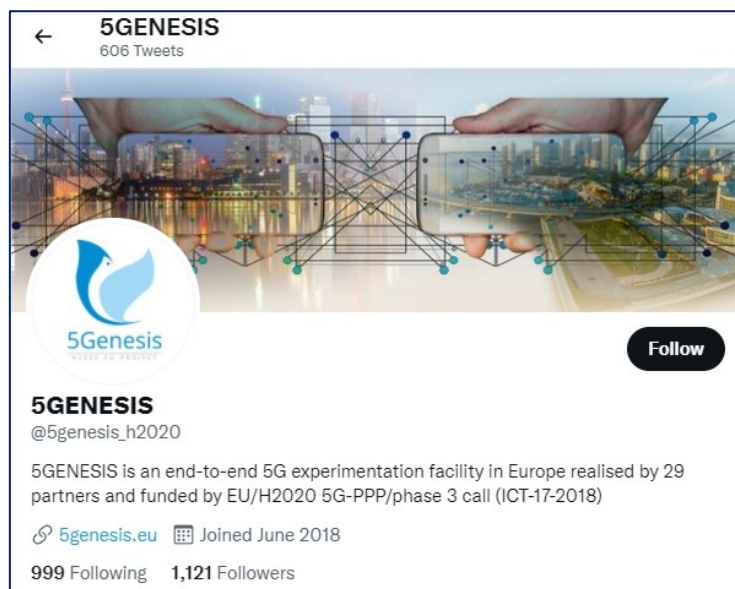


Figure 11. 5GENESIS Twitter Account

- 5GENESIS LinkedIn account “5GENESIS Project”: www.linkedin.com/in/5genesis-h2020/

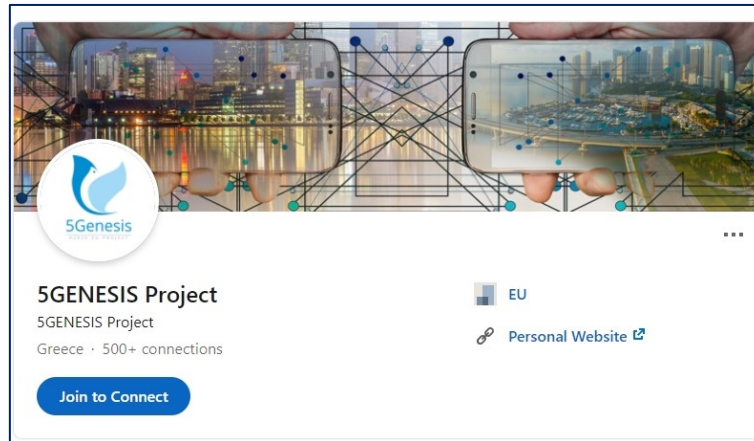


Figure 12. 5GENESIS LinkedIn Profile

- 5GENESIS Instagram account "5genesis_h2020": www.instagram.com/5genesis_h2020

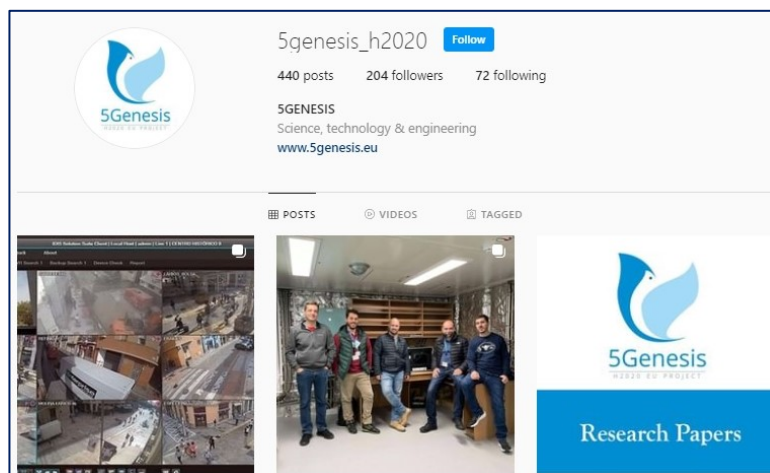


Figure 13. 5GENESIS Instagram profile

- 5GENESIS YouTube Channel: www.youtube.com/channel/UCrT3GgwTi3nGiHLWmKUkxug

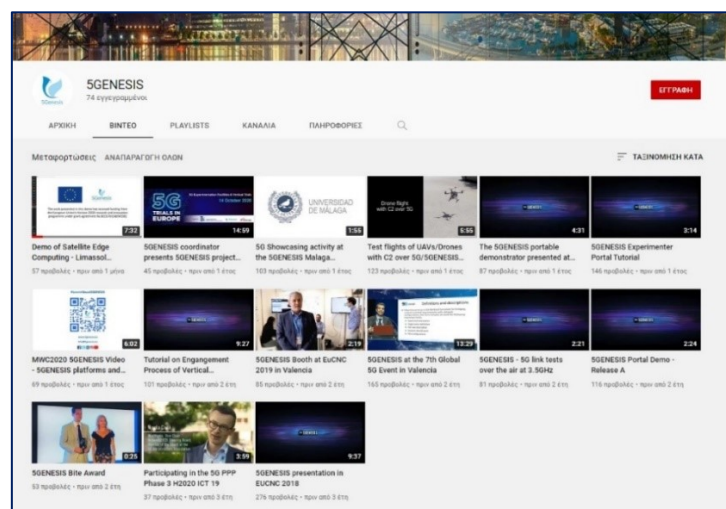


Figure 14. 5GENESIS YouTube Channel

2.1.2.1. Social Media Approach

In order to achieve the maximum visibility of the project and create loyal followers, the following communication approach was followed from the Kick-off Meeting of the project until its end, with appropriate adjustments/updates whenever needed. Posts have been made at least twice on a weekly basis and in case of special occasions (GA meetings, key events, very high workload of activities, etc.) there has been the highest posting activity/frequency for better impact creation. Whenever possible, the project has been linked to the presented/promoted events and activities, in which a partner represented the project, using mentions and hashtags related to the event. For instance, Dr. Harilaos Koumaras, 5GENESIS project coordinator, participated in the 5GTECHRITORY Forum (<https://www.5gtechritory.com/>) in November 2021. In order to link 5GENESIS post with the Forum, and achieve more visibility for the activity, we mentioned the event in our posting activity and the partner who took place in this activity. Figure 15 visualizes this methodology followed in various posts.



Figure 15. Exemplary Post, highlighting key information

The social media content, communicated via the official 5GENESIS social media channels, in most cases, has referred to activities and results related to 5GENESIS dissemination actions, use cases and trials. These activities span from research papers and publications to newsletters, conferences, workshops, trials and showcasing events of 5GENESIS.

However, in order to reach the widest possible audience, the social media of the project have also been used to publish and promote material of more general content (such as online articles and news on 5G). The social media channels have also been used for redirecting/forwarding audience to the 5GENESIS website. 5GENESIS website has served the main pool for the distribution of knowledge and results of the project, thus, it has been of utmost importance to often redirect the social media audience to the project's website.

Another additional tool for increasing the project visibility has been the extensive use of hashtags (#). Hashtags related to the project, to the funding sector and to related activities

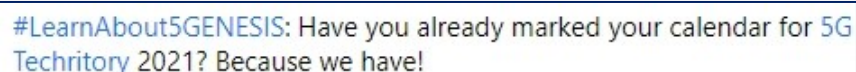
have been extensively used. The following figure summarizes an exemplary use of hashtags in social media posts during the third period.

A rectangular box containing a list of hashtags: #5G #5GPPP #research #EUfunded #H2020 #presentation #event #innovation.

#5G #5GPPP #research #EUfunded #H2020 #presentation #event
#innovation

Figure 16. Exemplary Hashtags

Since September 2018, 5GENESIS posts (promoting specific core activities of the project) have been issued with the hashtag “**#LearnAbout5GENESIS**” in all social media platforms, differentiating in this way such project specific posts from other more generic post activities. This project specific hashtag was also extensively used during the third period.

A rectangular box containing a social media post snippet: #LearnAbout5GENESIS: Have you already marked your calendar for 5G Techritory 2021? Because we have!

#LearnAbout5GENESIS: Have you already marked your calendar for 5G
Techritory 2021? Because we have!

Figure 17. Exemplary “#LearnAbout5GENESIS” Post

Furthermore, as the 5GENESIS project belongs to the family of projects run under the 5G-PPP partnership (<https://5g-ppp.eu/>), the 5G-PPP social media channels have also played a significant role to the social media approach of 5GENESIS since very often related content and events have been shared among those channels. In 5GENESIS channels, we have often posted activities (articles, newsflashes, newsletters, white papers, etc.) of the 5G-PPP partnership and any other related content with 5GENESIS reference contribution. Besides that, 5GENESIS social media posts and news have always included a **5G-PPP mention** (@5gppp, wherever applicable) and **5G-PPP related hashtags** (#5gppp, #5gppp_wg, #5gppp_whitepaper), enriching in this way the collaborative and joint impact creation.

2.1.3. 5GENESIS Newsletter

Since the start of the project in 2018, the 5GENESIS newsletter issues are being published quarterly. A new user could subscribe to the project’s mailing list on the official website to get project news and information about the latest newsletter issues. Each issue was first sent to the project’s partners through an e-mail, then to all mailing list subscribers (external audience), and finally was uploaded to the official website and communicated through 5GENESIS social media channels. Due to the nature of activities and accomplishments within each month, the newsletter material varied from issue to issue. However, some sections, such as GA meetings, deliverables, 5G-PPP and dissemination events, have constituted stable and permanent sections.

During the third period issues 9 to 14 have been published (issue 14 was under final editing at the time this deliverables was submitted), All issues of the newsletter may be accessed on the newsletter dedicated page on the 5GENESIS website (<https://5genesis.eu/category/newsletter/>), where they can be read online or downloaded.

2.1.4. Other Means and Channels

5GENESIS has also used additional means and channels in order to raise awareness of the project and achieve maximum visibility. The additional means and channels used since the project start are:

- Leaflets
- Posters
- 5G-PPP channels and WGs (refer to Section 5)
- Participation in Poster sessions, Business events, and innovation workshops (for the project's members)

2.1.4.1. Flyers and Leaflets

Since the beginning of the project, the leaflet has been constantly kept updated. Figure 18 represents an updated version of the leaflet, released in early 2021. The leaflet aims at promoting the project's vision, giving an introductory view about the fundamental elements of the project.

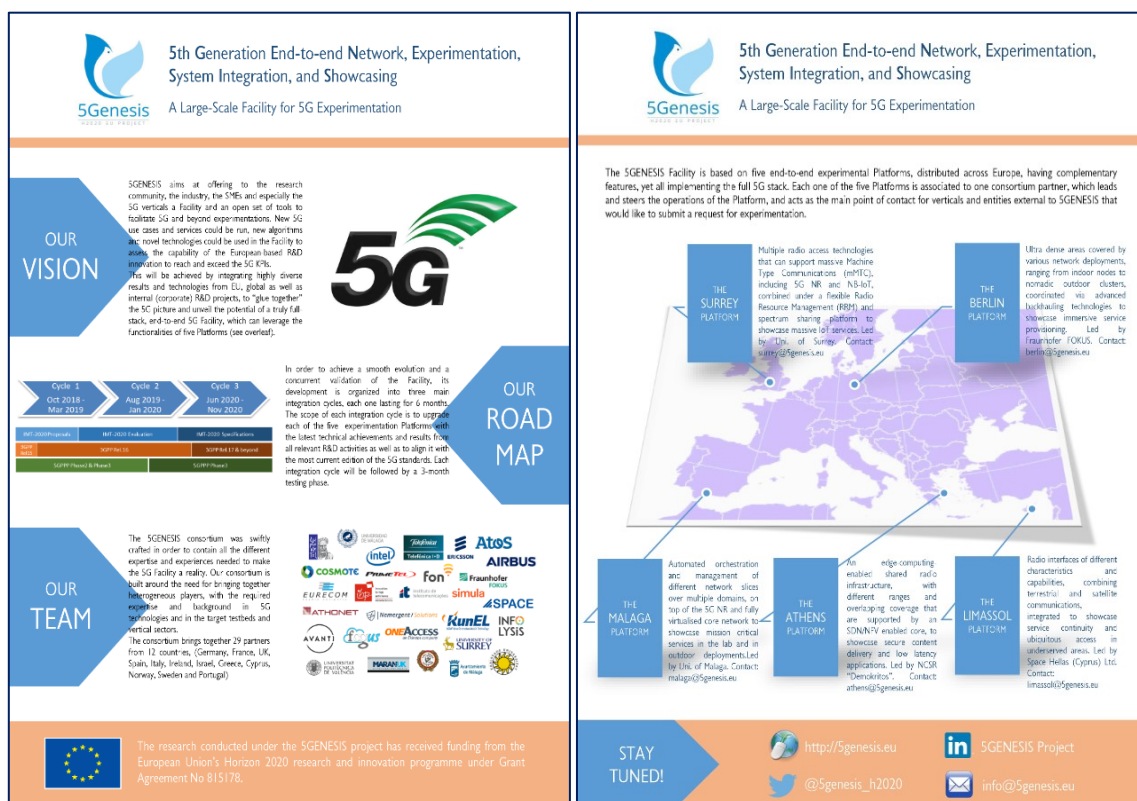


Figure 18. 5GENESIS Main Leaflet (front and back side)

In parallel, for being able to communicate and promote more effectively and efficiently the different characteristics, specifications, objectives and use cases of each platform, five additional leaflets have been developed since the first year of the project, each one focusing on a single platform.

The 5GENESIS leaflet is also available online at the website here: https://5genesis.eu/wp-content/uploads/2018/09/5GENESIS_general_leaflet.pdf

2.1.4.2. Posters

Banners and posters have also been created, to better promote project's activities in conferences, workshops and other similar events. Banners and posters have being used as supportive materials of the project's achievements since the beginning of the project. An exemplary 5GENESIS poster structure is shown in Figure 19.

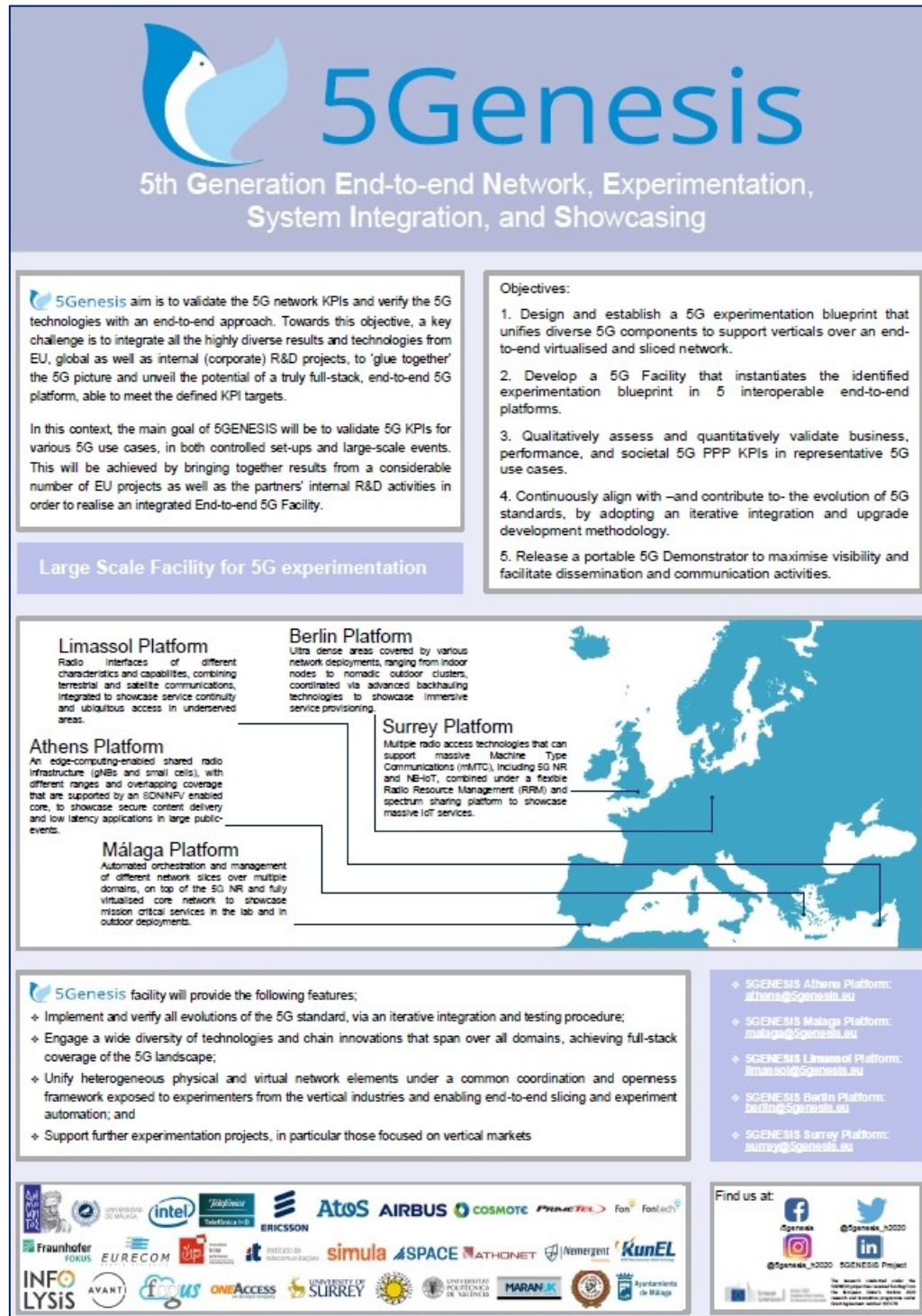


Figure 19: 5GENESIS Poster structure

2.2. Dissemination Means

As in the previous periods, several means for disseminating 5GENESIS have been used addressing both scientific/technical and non-technical audience. Unfortunately, due to the COVID-19 outbreak, it has been very difficult, if possible at all, to run or participate to face to face (f2f) events, and most of them were either turned into virtual events or reduced significantly the number of their sessions/workshops and overall activities or they were eventually cancelled or postponed to a future date.

2.2.1. 5GENESIS Publications

This section briefly summarises the various types of 5GENESIS publications during Period 3. The activity described in this section has been used as the core means of project scientific dissemination and communication.

2.2.1.1. Publications in Conferences, Journals and Workshops

5GENESIS published papers in conferences, journals and workshops during the third project period. In total, **27 papers have been published in journals and conferences and 3 papers in workshops** where 5GENESIS partners have participated. More details are provided in Sections 4.2.1 and 4.2.2.

2.2.1.2. Other Publications

Additional publications have been made by 5GENESIS partners addressing the general public interest. Through such publications, 5GENESIS has aimed at presenting the project to a wider and less technical audience, through means of general attention (such as articles in online websites, portals, newspapers, online magazines) and white papers (mainly in cooperation with 5G-PPP through corresponding WGs). **During the third period, 18 articles and 1 book chapter have been published by various 5GENESIS partners in a number of print and online media and 11 white papers.** More details are provided in Section 4.2.3 .

2.2.2. 5GENESIS Workshops, Special Sessions, Panels, Invited Talks

5GENESIS partners have participated, organized or co-organized numerous workshops, special sessions, panel discussions and invited talks since the beginning of the project.

During the third period, 5GENESIS has co-organised 11 workshops, participated in 10 panels discussions and invited talks, and also participated in 9 other various events such as poster sessions, booths and business/tech days. More details on the above activities are provided in Section 4.2.2, 4.2.6, 4.2.7. and 4.2.8.

2.2.3. 5GENESIS Presentations

During the third period of the project, 5GENESIS partners have made several presentations in conferences, workshops, and events, most of them remotely/virtually, addressing the audience

with the characteristics, advances, and main achievements of 5GENESIS. **During the period July 2020 - December 2021, 5GENESIS partners, have participated in 24 presentations promoting the project in various events.** Detailed analysis of the presentations is given in Section 4.2.6.

2.2.4. 5GENESIS Demonstration in industrial exhibitions and scientific events

The use of 5GENESIS demonstration in industrial exhibitions and scientific events is another dissemination means for the project targeting both experts and general audience. The target was to leverage on all the 5 platforms (Athens, Malaga, Berlin, Limassol, Surrey), so that each one of them could participate at least to one demonstration event before project conclusion. That target was already achieved in the second reporting period. A key principle for the demonstration was to provide (when needed) remote access to project's platforms, so that the platforms features could be better shown at the physical event location. Furthermore, emphasis was given to the portable demonstrator, as the major driver to run real-life demos in exhibitions and demo events so as to draw the attention of potential vertical industries. Moreover, the portable demonstrator has aimed at the general audience in order to showcase the advances of 5G, focusing on market-related features, like downloading speed and service provision agility. It has also included research-oriented implementations (open-source solutions) compared to the more commercial products used in the large-scale platforms of 5GENESIS. In the last period of the project (July 2020 - December 2021) various demonstrations in industrial exhibitions and scientific events took place with both physical and remote presence, due to the measures adopted against COVID-19. All the 5GENESIS platforms demonstrated their capabilities, targeting use case scenarios defined in the context of WP6. More information on Period 3 demonstration and showcasing events can be found in Section 4.3.

3. TOOLS FOR COORDINATING, MONITORING AND EVALUATING OUTREACH ACTIVITIES

During the third period, 5GENESIS partners continued intensively to monitor the progress of impact creation and used several tools for spotting potential deviations in comparison to the initial impact plan. These monitoring and control mechanisms have been in place since the project's start and have been constantly reviewed, adapted, and updated to the latest needs of the project and its partners.

3.1.1. BSCW file sharing portal

5GENESIS partners decided since the beginning of the project to use an online file sharing portal in order to enhance the coordination of the project and the communication between the partners. This file sharing portal was developed by the Fraunhofer Society and its access link is: <https://bscw.fokus.fraunhofer.de> (access granted only to project partners).

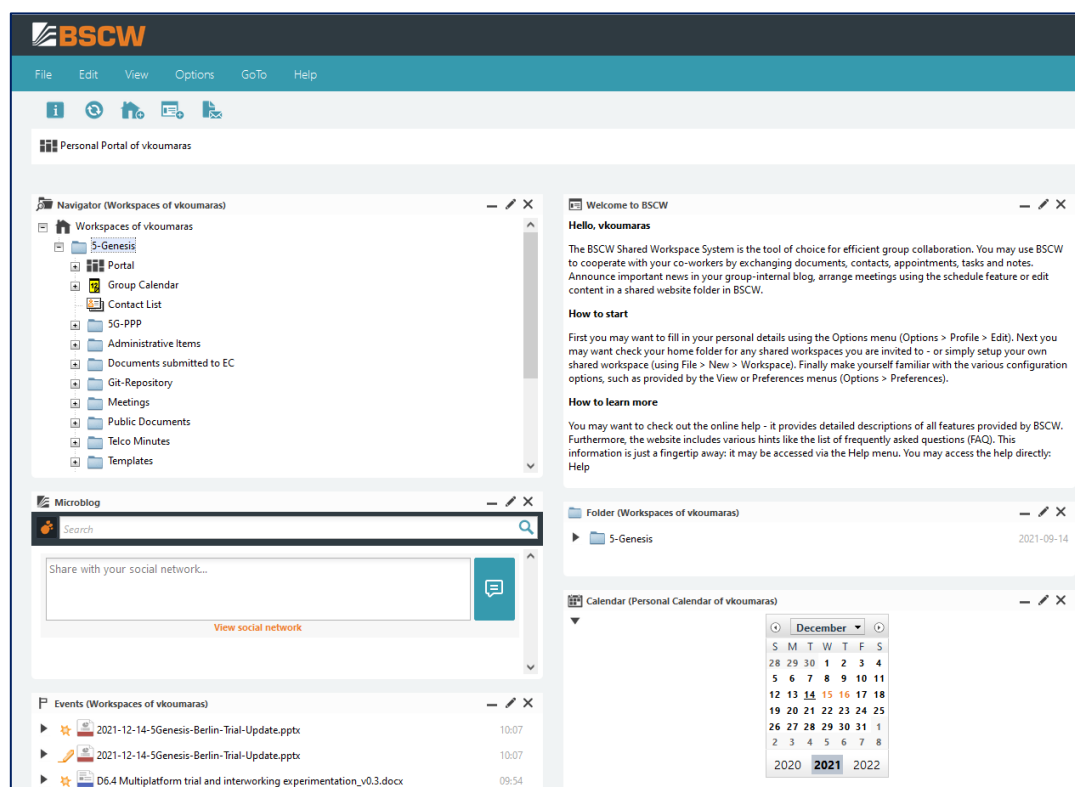


Figure 20. BSCW portal

Further details on the characteristics and use of BSCW, was provided in the deliverables D7.2 and D7.3.

3.1.2. WP7 activities and impact tracking file

As also previously mentioned, one of the main targets of this chapter is to provide information about the smooth collaboration of the partners through online collaborative tools. One additional tool that was utilized by the partners was the creation and extensive use of an online excel file stored in the BSCW repository, whose purpose is briefly presented further below.

The activities that the 5GENESIS partners performed or planned to perform were documented in this dedicated file with the distinctive title “WP7 activities”, residing in the WP7 folder in the BSCW. All project partners have had access to this excel file and have regularly updated the file with information on workshops, research papers, conferences and other activities related to 5GENESIS.

The WP7 activities excel file contains information for each of the documented activities such as the title of the activity, who is involved, the date and location of the activity as well as any additional related key information (e.g. a URL link or a small note from the partner(s) who performed each activity).

1	A	B	C	D	E	F
2	Item #	Authors (all)	Title	Target (date)	Link to 5GENESIS Task	Description
246	90	Online Article	Online Article for Malaga platform demo, Oct 2021	"5GENESIS - La Universidad probará la tecnología 5G durante la magna para controlar aglomeraciones", Oct 2021 https://www.diaisor.es/malaga-capital/uma-malaga-5g-magna-2021029142027-nt.html	Online Article	
247	91	Online Article	Online Article for Malaga platform demo, Oct 2021	"Un proyecto de la UMA durante la magna permitirá detectar situaciones de riesgo en grandes aglomeraciones", Oct 2021	Online Article	
248	92	Online Article	Online Article for Malaga platform demo, Oct 2021	"Un proyecto de la UMA durante la procesion magna permitirá detectar situaciones de riesgo en grandes aglomeraciones", Oct 2021 https://www.europapress.es/andalucia/malaga-00356/noticia-proyecto-uma-procesion-magna-permitira-detectar-situaciones-riesgo-grandes-aglomeraciones-20211029160950.html	Online Article	
249	93	Online Article	Online Article for Malaga platform demo, Oct 2021	"Un proyecto de la UMA durante la magna permitirá detectar situaciones de riesgo en grandes aglomeraciones", Oct 2021 https://www.20minutos.es/noticia/4873533/0/un-proyecto-de-la-uma-durante-la-magna-permitira-detectar-situaciones-riesgo-grandes-aglomeraciones-20211029160950.html	Online Article	
250	94	Online Article	Online Article for Malaga platform demo, Oct 2021	"La Policía del futuro patrullará este sábado en Málaga por la procesion magna gracias al 5G", Oct 2021 https://www.eldespanol.com/malaga/malaga-ciudad/20211028/policia-futuro-patrullara-sabado-malaga-procesion-gracias/62268594_0.html	Online Article	
251	95	Online Article	Online Article for Malaga platform demo, Oct 2021	"Un proyecto de la UMA durante la magna permitirá detectar situaciones de riesgo en grandes aglomeraciones", Oct 2021 https://www.101tv.es/noticia.aspx?id=514878&title=Un-proyecto-de-UMA-durante-la-magna-permitira-detectar-situaciones-de-riesgo-en-aglomeraciones	Online Article	
252	96	Online Article	Online Article for Malaga platform demo, Oct 2021	"El uso de la tecnología 5G para cámaras móviles es un buen ejemplo, en conjunto con la Policía Local de Málaga y Telefonía", Oct 2021 https://diarioocja.com/malaga/el-proyecto-uma-detectara-escenarios-de-riesgo-en-grandes-multitudes-durante-la-marcha-de-magna/	Online Article	
253	97	Online Article	Online Article for Malaga platform demo, Oct 2021	"Comprueba en la Procesion Magna de Málaga que el 5G permite detectar situaciones de riesgo", Nov 2021 https://novacenencia.es/comprueba-en-la-procesion-magna-de-malaga-que-el-5g-permite-detectar-situaciones-de-riesgo-en-grandes-aglomeraciones-20211029160950.html	Online Article	
254	98	Online Article	Online Article for Malaga platform demo, Nov 2021			
255	99	Limassol platform DEMO		5GENESIS Limassol platform trials of satellite-backhauled 5G maritime communications services on-board MARAN GAS KALYMNOS under fully operational conditions at sea. Location: On-board MARAN GAS KALYMNOS vessel (Angelicos Group), 3 November 2021	DEMO	Event: 5GENESIS Limassol platform trials of satellite-backhauled 5G maritime communications services on-board MARAN GAS KALYMNOS under fully operational conditions at sea. Location: On-board MARAN GAS KALYMNOS vessel (Angelicos Group), 3 November 2021 https://5g.ppp.eu/wp-content/uploads/2021/11/Architecture-WP-V4.0-final.pdf
256	100	SGPPP WHITE PAPER	SG PPP Architecture white paper v4.0	SG PPP Architecture white paper v4.0 with 5GENESIS contributions	white paper	Newerent R&D team, 5GENESIS partner and member of 5GENESIS Malaga platform use cases, demonstrates the integration of 3GPP MCPTT calling over a 5G network, and enabling interconnection with DMR talkgroups. This demo took place at the Newerent booth in the Critical Communications World (CCW2021) conference and exhibition, Madrid, Spain, 3-5 November 2021 as part of 5GENESIS SG Malaga platform activities. (Video url: https://youtu.be/Gp0a2xg3mU)
257	101	NEREMERGENT Booth and Demo video:	CCCA - Critical Communication World 2021 (CCW2021), 3-5 November 2021, Madrid, Spain (https://www.critical-communications-world.com/)	Demonstration of the interworking of 5G MCX with the DMR system, the one used by Malaga Police, and also part of the 5GENESIS Malaga platform trials.	DEMO video	

Figure 21. 5GENESIS WP7 Activities tracking file

More detailed analysis on the use of WP7 activities file was provided in deliverables D7.2 and D7.3. This file has been extensively used during Period 3 and has been the main source of documenting and organising performed and upcoming project impacting activities.

3.1.3. 5GENESIS Social Media and Website Statistical Dashboards

Since the beginning of the project, INFOLYSiS, the T7.1 leader, has initiated the collection and the visualization of data related to 5GENESIS website and social media channels. For the better and informative visualization of these data, the INFOLYSiS team has used Google Data Studio (<https://datastudio.google.com/>). These statistical dashboards related to website and social media data have been issued monthly and have been distributed internally at the beginning of each month via emails to the 5GENESIS WP7 mailing list. All the monthly statistical dashboard links have been maintained in a word document in the BSCW repository, thus making it easier

for each partner to access them at any time. The statistical dashboards, as previously stated, have been issued monthly but upon request (e.g., for GA meetings or 5GENESIS presentations and reviews) they can be issued for a longer period of time such as quarterly or annually. In conclusion, these Google Data Studio dashboards is another additional means, which contributes to the better evaluation and assessment of the projects progress. Details on the use of statistical dashboards as monitoring tools have been extensively provided also in D7.2 and D7.3.

More details on annual and monthly 5GENESIS social media and website dashboards of Period 3 are provided in Sections 4.4.3 and in Annex 1 – Monthly 5GENESIS Social Media Statistical Dashboards (July 2020-October 2021) and Annex 2 – Monthly 5GENESIS Website Statistical Dashboards (July 2020-October 2021).

3.1.4. WP7 telcos

WP dedicated telcos was another monitoring method of the 5GENESIS activities. Organizing telcos at WP level was extremely useful for the distribution of workload between interrelated tasks. It is worth mentioning that this specific means was of huge importance especially in the COVID-19 period. Meetings regarding WP7 activities took place regularly, monthly or bimonthly, during the third period and the partners discussed the progress made as well as the next steps to be taken towards their planned actions.

3.1.5. WP7 mailing list/emails

The telcos organized by the WPs could not cover all the project and partner needs, since offline communication was also necessary during the everyday collaboration. For that reason, distinctive mailing lists, per WPs, have been used in order to ensure the smooth collaboration between of the partners and function of the dedicated WPs and tasks.

During the third period, the WP7 mailing list has been used to coordinate the activities of the partners as well as to promote, align and coordinate various dissemination activities especially since COVID-19 has impacted f2f meetings and interactions.

3.1.6. GA Meetings

The GA meetings are the core coordination event and serve as an opportunity for a meeting among all partners. During the GA meeting the partners discuss the project's current and upcoming status as well as the action plans that need to be taken. The 5GENESIS partners, since the project initiation, have organized various GA Meetings in different locations (prior to the COVID-19 era).

The GA Meetings of the third period have been organized only virtually following the lockdowns and travel/meeting restrictions due to COVID-19. Table 2 summarizes all Period 3 5GENESIS GA virtual meetings and further below each one is briefly analysed.

GA Meetings		
GA Meetings	Location	Date
Nineth Meeting	Virtual Meeting	2-3/9/2020
Tenth Meeting	Virtual Meeting	24-26/11/2020
Eleventh Meeting	Virtual Meeting	16-18/02/2021
Twelfth Meeting	Virtual Meeting	19-20/05/2021
Thirteenth Meeting	Virtual Meeting	19/10/2021
Fourteenth Meeting	Virtual meeting	14-16/12/2021

Table 2. GA Meetings (Third period)

- Nineth Meeting**

Due to the COVID-19 impact and safety restrictions that applied worldwide, the 9th 5GENESIS GA plenary meeting took place virtually. It lasted two days (2-3 September 2020) discussing the project progress, trial activities, upcoming deliverables, demos and goals to be met during the 3rd phase of the project. More than 40 participants attended.



Figure 22 Nineth GA Meeting

- Tenth Meeting**

The 10th 5GENESIS GA plenary meeting took place online. It ran for 3 days (24-26 November 2020) and following the dedicated approach of GA meetings, the project progress, upcoming deliverables, trial activities, demos, and goals to be met during the 3rd phase of the project were extensively discussed. The main subjects of the meeting were about the 5GENESIS platforms' the impact activities of the project and the ongoing activities of several work packages.

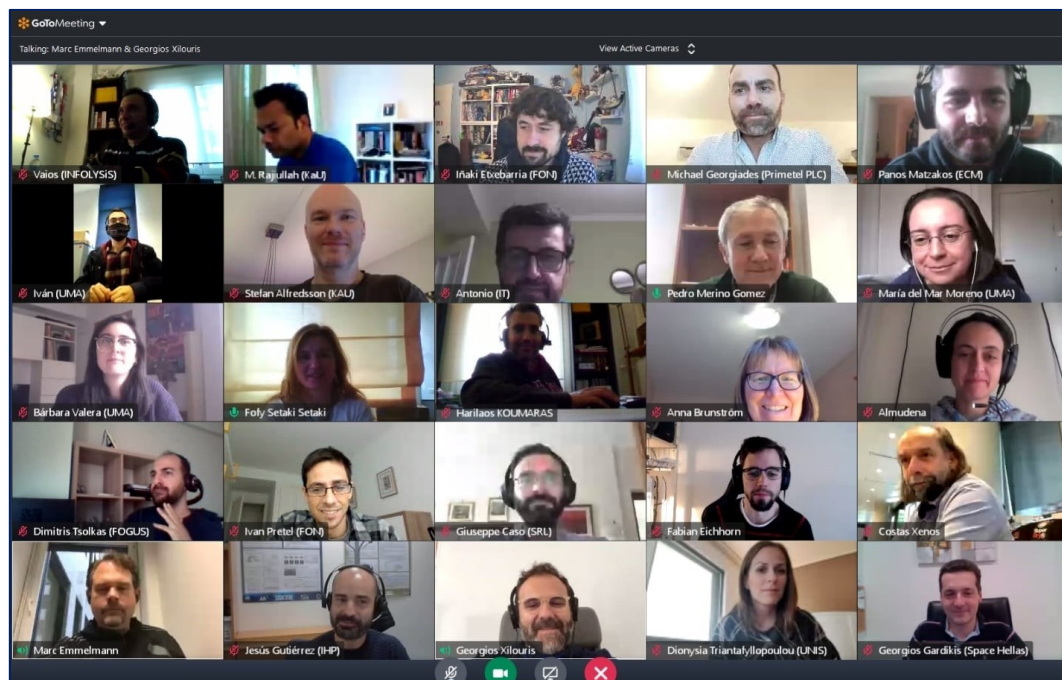


Figure 23 Tenth GA Meeting

- Eleventh Meeting

The 11th 5GENESIS GA plenary meeting took place in a virtual environment and ran for 3 days (16-18 February 2021). Approximately 50 partners' representatives participated in this online GA meeting and discussed about plans related to experimental platforms, use cases, trials and upcoming deliverables.

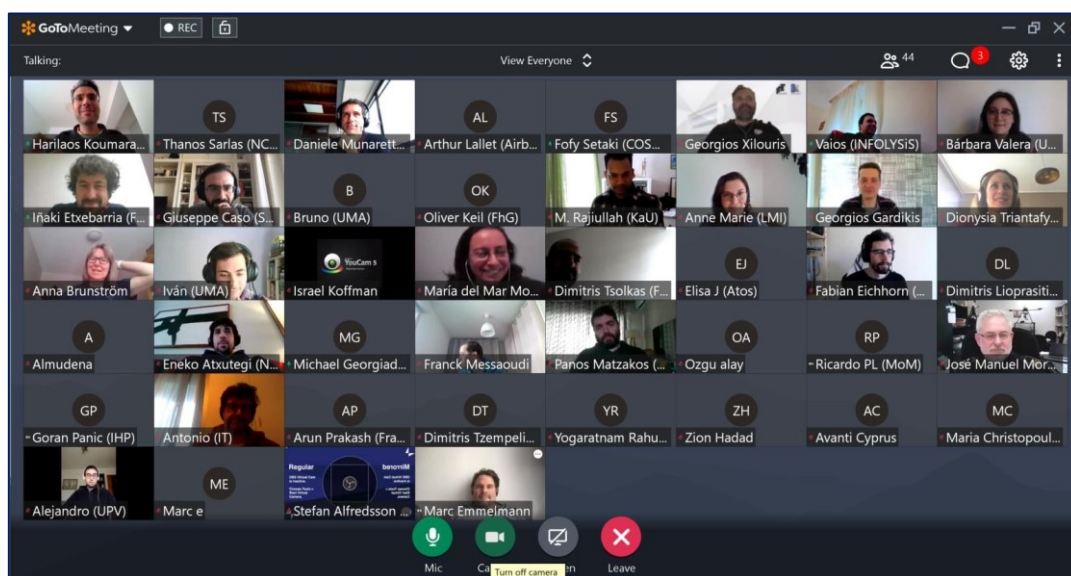


Figure 24 Eleventh GA Meeting

- Twelfth Meeting

The 12th 5GENESIS GA plenary ran for 2 days (19-20 May 2021) again in a virtual way, summing up to 50 participants from the different consortium partners. The discussion focused on actions

related to Open5GENESIS release B status, on platforms status and results showcasing, as well as on upcoming deliverables.



Figure 25 Twelfth GA Meeting

- **Thirteenth Meeting**

The 13th 5GENESIS plenary meeting took place online on Tuesday 19 October 2021. Core planning actions were discussed towards the execution of the final trials to all five 5GENESIS platforms. The last set of deliverables, that were under editing, were presented and discussions were made towards the closure actions of the project and final review preparations.

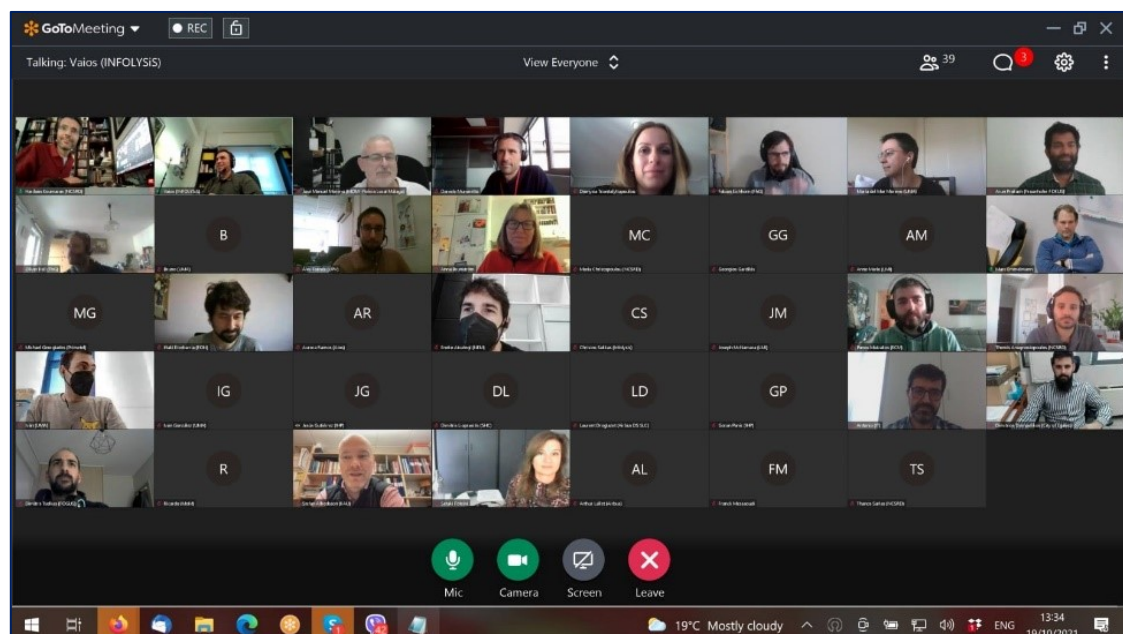


Figure 26 Thirteenth GA Meeting

- **Fourteenth Meeting (final one)**

The last 5GENESIS plenary meeting (14th) took place in December 2021. It lasted for three days (14-16 December 2021) and it is once more organised remotely due to COVID-19 pandemic

restrictions. Main topics to discussed and presented: final showcasing events, final deliverables and preparatory actions for the final project review.



Figure 27 Fourteenth GA Meeting

4. OUTREACH ACTIVITIES – PERIOD 3

This section focuses on Period 3 performance and statistics related to the 5GENESIS outreach activities, including also details, information, and references of the activities performed.

4.1. Dissemination and Communication Goals of Period 3

The initial planning of the 5GENESIS communication and dissemination strategy (you may refer the D7.1 for more details) provided specific goals and KPIs that were to be met in the third and final period of the project. In more details the goals refer to an indicative number of publications of scientific results and of experiments and other practical activities, e.g., demos, targeting the largest scientific and industrial communities, conferences and journals. Demonstrations and trials in industrial exhibitions and scientific events were also targeted.

The following table summarizes the project's overall quantitative goals (as set at proposal level and described in the Description of Action (DoA) document), which form the backbone of dissemination and communication activities for the entire lifespan of the project (as already set at the 5GENESIS proposal stage and further elaborated in D7.1).

Activity	Metrics to measure impact	Goal	Timing (3 years)
Publications	Number of publications	>50 in total (>25 in journals conferences, workshops)	Workshops: year 1-3 Conferences: year 1-3 Journals: years 2-3 (and after the end of the project)
Demonstrations in industrial/exhibitions and scientific events	Number of demos	>10	5GENESIS demonstrations at the end of each integration cycle

Table 3. 5GENESIS Overall Dissemination and Communication Goals

As already mentioned in previous deliverables, 5GENESIS dissemination activities' intensity differed in the different periods of the project's lifetime. In order to better monitor and safeguard the goals completion per time period, the dissemination activities have been divided in three different time periods in relationship with the project's periods. The dissemination goals have been further elaborated (providing more detailed events and targets) and set in a way to depict the above-mentioned differentiation. So, an indicative split ratio of 20/35/45 related to the three phases of the project was used, so to give us the opportunity to notch the dissemination and the communication strategy along the lifetime of the project, the type of the activities and the equivalent goals of the project.

- Phase 1: M1-M12 (20% of total targeted activities)
- Phase 2: M13-M24 (35% of total targeted activities)
- Phase 3: M25-till and after project end (45% of total targeted activities)

As a result of the previous mentioned approach, the table below briefly depicts Period 3 goals (as set in D7.1 and D7.3) spanning from July 2020 to December 2021.

Activity	Period 3 Goals
Publications (in Journals/Conferences)	>11 in journals/conferences/workshops (>22 as total publications)
Publications (in Workshops)	
General Publications (Article in Magazines, Books, Websites, Newspapers)	
Workshops (organized by 5GENESIS, co-organized with other projects, participation)	>11
Presentations (in Conferences, Workshops, InfoDays, Events)	>11
Participation in Conference Panels and Invited Talks	>5
Others (Exhibitions, Business Days, Booths in Conferences, Poster Sessions, Awards)	>11
Demonstrations in industrial/exhibitions and scientific events	>5
Period 3 Total number of targeted activities and articles	>65

Table 4. 5GENESIS Dissemination and Communication Goals of the third period

4.2. Summary of Dissemination and Communication Achievements – Period 3

This section focuses on documenting 5GENESIS communication and dissemination activities according to the type of activity that occurred during the third phase. Table 5 summarizes all Period 3 successfully performed 5GENESIS dissemination activities (broken-down per activity type).

In Period 3 a total of 129 activities have been performed outscoring by far the set goal of 65.

Activity	Period 3 Achievements
Publications (in Journals/Conferences)	30
Publications (in Workshops)	
General Publications (Article in Magazines, Books, Websites, Newspapers, White Papers)	
Workshops (organized by 5GENESIS, co-organized with other projects, participation)	11
Presentations (in Conferences, Workshops, InfoDays, Events)	24
Participation in Conference Panels and Invited Talks	10
Others (Exhibitions, Business Days, Booths in Conferences, Poster Sessions, Awards)	9

Demonstrations in industrial/exhibitions and scientific events	15
Period 3 Total number of performed activities	129

Table 5. Period 3 Dissemination and Communication activities

4.2.1. Publications in Conferences and Journals – Period 3

During Period 3, 5GENESIS partners submitted a variety of papers to conferences and journals that were accepted for publication. The third's period total number of conference and journal publications are summarized in Table 6, where information on the title of the paper, the event/journal date, the location/issue number, as well as links for direct download the papers in pdf format, is given.

Please note that few publications, referring to the previous period of the project, which were not actually reported/included in the previous deliverable due to delay in notification about their acceptance and publication, are also included here.

Publications in Conferences and Journals				
	Title	Event/Journal	Date/Location/issue	Accepted version, Download Link and DOI
1	A New Dimension to Spectrum Management in IoT Empowered 5G Networks	IEEE Network	July/August 2019	https://5genesis.eu/wp-content/uploads/2020/09/A_New_Dimension_to_Spectrum_Management.pdf IEEE: https://ieeexplore.ieee.org/document/8782891
2	Multi-Carrier M-ary DCSK System with Code Index Modulation: An Efficient Solution for Chaotic Communications	IEEE Journal of Selected Topics in Signal Processing	October 2019	https://5genesis.eu/wp-content/uploads/2020/09/Multi-Carrier-M-ary-DCSK-System-with-Code.pdf IEEE: https://ieeexplore.ieee.org/document/8703732
3	A Promising Non-Orthogonal Multiple Access Based Networking Architecture: Motivation, Conception, and Evolution	IEEE Wireless Communications	October 2019	https://5genesis.eu/wp-content/uploads/2020/09/A-Promising-Non-Orthogonal-Multiple-Access-Based-Networking.pdf DOI: 10.1109/MWC.2019.1900021
4	Control and data channel combining in Ultra-Reliable Low-Latency Communication	IEEE Asilomar Conference on Signals, Systems, and Computers,	3-6 November 2019	https://5genesis.eu/wp-content/uploads/2020/08/Control-and-data-channel-combining-in-Ultra-Reliable-Low-Latency-Communication.pdf

5	Physical-Layer Network Coding: An Efficient Technique for Wireless Communications	IEEE Network	March/April 2020	https://5genesis.eu/wp-content/uploads/2020/09/Physical-Layer-Network-Coding-An-Efficient-Technique-for-Wireless-Communications.pdf DOI: 10.1109/MNET.001.1900289
6	Feedback enhancements for semi-persistent downlink transmissions in ultra-reliable low-latency communication	EUCNC 2020	15 June 2020	https://5genesis.eu/wp-content/uploads/2020/08/Feedback-enhancements-for-semi-persistent-downlink-transmissions-in-ultra-reliable-low-latency-communication.pdf
7	On the Use of a Virtualized 5G Core for Time Critical Communication in Smart Grid	8th IEEE International Conference on Mobile Cloud Computing, Services, and Engineering (MobileCloud)	3-6 August, 2020	https://ieeexplore.ieee.org/document/9126750 DOI: 10.1109/MobileCloud48802.2020.000009
8	Utilizing Multi-Connectivity to Reduce Latency and Enhance Availability for Vehicle to Infrastructure Communication, IEEE Transactions on Mobile Computing	IEEE Transactions on Mobile Computing	October 2020	https://ieeexplore.ieee.org/document/9211792 , DOI: 10.1109/TMC.2020.3028306
9	Guidelines for an Energy Efficient Tuning of the NB-IoT Stack	IEEE 45th Conference on Local Computer Networks (LCN)	16-19 November 2020	https://ieeexplore.ieee.org/document/9363265 DOI: 10.1109/LCNSymposium50271.2020.9363265
10	A Modular Experimentation Methodology for 5G Deployments: The 5GENESIS Approach	Sensors special issue Experimentation in 5G and beyond Networks: State of the Art and the Way Forward	20 November 2020	https://www.mdpi.com/1424-8220/20/22/6652/html
11	A Survey of End-to-End Solutions for Reliable Low-Latency Communications in 5G Networks	IEEE Access	2020	https://ieeexplore.ieee.org/document/9234518

12	"NB-IoT Random Access: Data-driven Analysis and ML-based Enhancements"	IEEE Internet Things Journal	2021	https://mosaic-simulamet.com/nbiot-randomaccess/
13	5G-Enabled UAVs with Command and Control Software Component at the Edge for Supporting Energy Efficient Opportunistic Networks	MDPI, Special Issue 5G Enabled Energy Innovation, Energies 2021	2021	https://5genesis.eu/research-papers/
14	"Energy Efficiency in Short and Wide-Area IoT Technologies – A Survey"	Special Issue: Reviews and Advances in Internet of Things Technologies on the MDPI Technologies 2021 journal	2021	https://www.mdpi.com/2227-7080/9/1/22 DOI: https://www.mdpi.com/2227-7080/9/1/22
15	"Empirical Models for NB-IoT Path Loss in an Urban Scenario"	IEEE Internet of Things Journal	2021	https://5genesis.eu/wp-content/uploads/2021/03/SRL-KAU-Internet-of-Things-Journal-2021-Empirical-Models-for-NB-IoT-Path-Loss-in-an-Urban-Scenario.pdf
16	"Network Slicing for 5G Edge Services"	Internet Technology Letters journal, 2021	March 2021	https://onlinelibrary.wiley.com/doi/10.1002/itl2.289
17	"Modelling Power Amplifier Impairments in mmWave Phased-Array Systems"	ET Electronics Letters	April 2021	https://5genesis.eu/wp-content/uploads/2021/09/el_ph_aa_clean.pdf
18	Multipath Scheduling for 5G Networks: Evaluation and Outlook	IEEE Communications Magazine	May 2021	https://ieeexplore.ieee.org/document/9433513
19	"User-Centric Radio Access Technology Selection: A Survey of Game Theory Models and Multi-Agent Learning Algorithms"	IEEE Access	June 2021	https://ieeexplore.ieee.org/document/9448025
20	Adaptive and Latency-Aware Load Balancing for Control Plane Traffic in the 4G/5G Core	Joint EuCNC & 6G Summit	8-11 June 2021	https://ieeexplore.ieee.org/document/9482513

				DOI: 10.1109/EuCNC/6GSummit5110 4.2021.9482513.
21	“Field Trial of UAV flight with Communication and Control through 5G cellular network”	IEEE MeditCom 2021	September 2021	https://5genesis.eu/wp-content/uploads/2021/09/m19816-makropoulos.pdf
22	Satellite edge computing for 5G rural applications	IEEE MeditCom 2021	September 2021	https://5genesis.eu/wp-content/uploads/2021/09/Satellite-edge-computing-for-5G-rural-applications_CR.pdf
23	“An open source 5G experimentation testbed”	IEEE MeditCom 2021	September 2021	https://5genesis.eu/wp-content/uploads/2021/09/m20182-matzakos.pdf
24	Metrics-based Outlier Detection for 5G security	IEEE MeditCom 2021	September 2021	https://5genesis.eu/wp-content/uploads/2021/09/Metrics-based-outlier-detection-for-5G-security.pdf
25	“Real-time Physical Layer Secure Key Generation in a mmWave Communication System	17 th International Symposium on Wireless Communication Systems (ISWCS)	September 2021	https://5genesis.eu/wp-content/uploads/2021/09/chaniganathota_manjappa-m28408-c_manjappa-2021.pdf
26	Modeling and verification of the Multi-connection TactileInternet Protocol	Q2Swinet’21	2021	https://dl.acm.org/doi/10.1145/3479242.3487328
27	“A Novel Machine Learning-based Scheme for Spectrum Management in Virtualized 5G Networks”	IEEE Transactions on Intelligent Transportation Systems	November 2021	(Under final review)

Table 6. Publications in Conferences and Journals

4.2.2. Publications in Workshops and Special Sessions of Conferences– Period 3

Table 7 summarizes 5GENESIS publications at workshops and special sessions of conferences throughout Period 3 of the project. The name of the workshop, the title of the paper, the event date, and a link for the download in pdf format are all provided in each entry.

Publications in Workshops/Special Sessions of Conferences					
	Title	Workshop	Event	Date/Location	Accepted preprint version Download Link
1	Deployment of 5G Experiments on Underserved Areas Using the	IEEE SmartNets 2021	(International Conference on Smart Applications,	22-23 September 2021	https://ieeexplore.ieee.org/document/9555428 DOI:

	Open5GENESIS Suite		Communications and Networking		10.1109/SmartNets50376.2021.9555428
2	“Extending Network Slice Management to the End-host”	Workshop on 5G Measurements, Modeling, and Use Cases (5G-MeMU)	ACM SIGCOMM 2021	23 August 2021	https://dl.acm.org/doi/10.1145/3472771.3472775
3	“Experimentation and 5G KPI measurements in the 5GENESIS platforms”	Workshop on 5G Measurements, Modeling, and Use Cases (5G-MeMU)	ACM SIGCOMM 2021	23 August 2021	https://dl.acm.org/doi/10.1145/3472771.3472776

Table 7. Publications in Workshops and Special Sessions of Conferences

4.2.3. General Publications in Books, Websites, Magazines, Books and Newspapers - Period 3

Table 8 summarizes the publication of papers and articles in media such as books, websites, newspapers, magazines during the third period of the 5GENESIS project. A link to the electronic version of the source that hosted the publication is provided, as well as a link to download the publication in pdf format.

Papers/Articles (in magazines/books/newspapers/websites)				
	Title	Media	Date	Link
1	Demokritos joined forces with 28 partners in order to research 5G technology	EKT.gr	21-07-2020	https://www.ekt.gr/el/news/24616
2	“Technical trials of drones and 5G at Municipal stadium of Egaleo”	aigaleo.gr	22/10/2020	https://www.aigaleo.gr/2020/10/22/technikes-dokimes-5g-me-drones-sto-dimotiko-gipedo-aigaleo/
3	5G!Drones Project: Feasibility Tests in Athens MNL	iit.demokritos.gr	26/10/2020	https://www.iit.demokritos.gr/newsevents/5gdrones-feasibility-tests-athens/
4	“5G Trials in Europe: 5G Experimentation Facilities and Vertical Trials: Current Status and	iit.demokritos.gr	26/10/2020	https://www.iit.demokritos.gr/newsevents/iit-dedicates-october-5g-networks/

	Future Perspectives”			
4	Drones over Egaleo city	xypos.gr	23/10/2020	https://www.xypos.gr/%CE%B4%CE%AE%CE%BC%CE%BF%CE%B9-%CE%B1%CF%84%CF%84%CE%B9%CE%BA%CE%AE%CF%82/%CE%B4%CE%AE%CE%BC%CE%BF%CF%82-%CE%B1%CE%B9%CE%B3%CE%AC%CE%BB%CE%B5%CF%89/drones-%CE%BC%CE%B5-5g-%CF%80%CE%AD%CF%84%CE%B1%CE%BE%CE%B1%CE%BD-%CF%80%CE%AC%CE%BD%CF%89-%CE%B1%CF%80%CF%8C-%CF%84%CE%BF-%CE%B1%CE%B9%CE%B3%CE%AC%CE%BB%CE%B5%CF%89/
5	“5G and Drones trials at Egaleo stadium”	kedke.gr	24/10/2020	https://kede.gr/technikes-dokimes-5g-me-drones-sto-dimotiko-gipedo-aigaleo/
6	“NCSR Demokritos pioneering activities in 5G research and EU 5G-PPP projects”	Startupper Magazine	3/2021	https://5genesis.eu/wp-content/uploads/2021/03/startupper-NCSR.pdf
7	Demuestran en directo durante La Magna cómo el 5G permite 49rganize situaciones de riesgo en grandes aglomeraciones	uma.es	11/2021	https://www.uma.es/sala-de-prensa/noticias/demuestran-en-directo-durante-la-magna-como-la-tecnologia-5g-permite-detectar-situaciones-de-riesgo-en-grandes-aglomeraciones/
8	Control de cámaras en directo de las calles del Centro con tecnología 5G	diariosur.es	11/2021	https://www.diariosur.es/semana-santa/control-cameras-directo-procesion-magna-20211030202139-nt.html

9	La Universidad probará la tecnología 5G durante la magna para controlar aglomeraciones	diariosur.es	11/2021	https://www.diariosur.es/malaga-capital/uma-malaga-5g-magna-20211029142207-nt.html
10	Comprueba en la Procesión Magna de Málaga que el 5G permite 5Organize situaciones de riesgo	novaciencia.es	11/2021	https://novaciencia.es/comprueba-en-la-procesion-magna-de-malaga-que-el-5g-permite-detectar-situaciones-de-riesgo/
11	Un proyecto de la UMA durante la Magna permitirá 5Organize situaciones de riesgo en grandes aglomeraciones	malagahoy.es	11/2021	https://www.malagahoy.es/malaga/proyecto-UMA-Magna-riesgo-aglomeraciones_0_1624339150.html
12	n proyecto de la UMA durante la 5Organized50 magna permitirá 5Organize situaciones de riesgo en grandes aglomeraciones	europapress.es	11/2021	https://www.europapress.es/andalucia/malaga-00356/noticia-proyecto-uma-procesion-magna-permitira-detectar-situaciones-riesgo-grandes-aglomeraciones-20211029160950.html
13	Un proyecto de la UMA durante la magna permitirá 5Organize situaciones de riesgo en grandes aglomeraciones	20minutos.es	11/2021	https://www.20minutos.es/noticia/4873519/0/un-proyecto-de-la-uma-durante-la-magna-permitira-detectar-situaciones-de-riesgo-en-grandes-aglomeraciones/
14	Un proyecto de la UMA durante la magna permitirá 5Organize situaciones de riesgo en grandes aglomeraciones	noticiasde.es	11/2021	https://www.noticiasde.es/andalucia/malaga/un-proyecto-de-la-uma-durante-la-magna-permitira-detectar-situaciones-de-riesgo-en-grandes-aglomeraciones/
15	Un proyecto de la UMA durante la magna permitirá 5Organize situaciones de riesgo en grandes aglomeraciones	teleprensa.com	11/2021	https://www.teleprensa.com/articulo/malaga/proyecto-uma-magna-permitira-detectar-situaciones-riesgo-grandes-aglomeraciones/202110291612461060999.html

16	Un proyecto de UMA durante la magna permitirá 51rganize situaciones de riesgo en aglomeraciones	101tv.es	11/2021	https://www.101tv.es/noticia.aspx?id=51487&title=Un-proyecto-de-UMA-durante-la-magna-permitira-detectar-situaciones-de-riesgo-en-aglomeraciones
17	EL PROYECTO UMA DETECTARÁ ESCENARIOS DE RIESGO EN GRANDES MULTITUDES DURANTE LA MARCHA DE MAGNA	diarioecija.com	11/2021	https://diarioecija.com/malaga/el-proyecto-uma-detectara-escenarios-de-riesgo-en-grandes-multitudes-durante-la-marcha-de-magna/
18	La Policía del 51rgani patrullará este sábado en Málaga por la 51rganized51 magna gracias al 5G	elespanol.com	11/2021	https://www.elespanol.com/malaga/malaga-ciudad/20211028/policia-futuro-patrullara-sabado-malaga-procesion-gracias/622688584_0.html
19	"Drive Towards 6G". Book Chapter in: "Enabling 6G Mobile Networks"	Springer, Cham, p. 3-35	11/2021	https://link.springer.com/chapter/10.1007%2F978-3-030-74648-3_1 DOI: 10.1007/978-3-030-74648-3_1

Table 8. Papers/Articles/Chapters in books/magazines/newspapers/websites

4.2.4. White papers - Period 3

In period 3, 5GENESIS partners, contributed to various white papers, especially in cooperation with 5G-PPP through the WGs that 5GENESIS partners have attended. Table 9 lists all of the white papers issued during the project's third phase.

White Papers & 5GPPP Publications				
	Target Websites	Title	Date	Link
1	5G-PPP	"Empowering Vertical Industries through 5G Networks – Current Status and Future Trends"	August 2020	https://5g-ppp.eu/wp-content/uploads/2020/09/5GPPP-VerticalsWhitePaper-2020-Final.pdf

2	5G-PPP	Annual Progress Monitoring Report (2019 release)	October 2020	https://5g-ppp.eu/annual-progress-monitoring-reports/
3	5G-PPP	Edge Computing for 5G Networks	February 2021	https://5g-ppp.eu/white-paper-on-edge-computing-for-5g-networks/
4	5G-PPP	AI and ML – Enablers for Beyond 5G Networks	11 May 2021	https://5g-ppp.eu/wp-content/uploads/2021/05/AI-MLforNetworks-v1-0.pdf
5	5G-PPP	5G Annual Journal 2021	May 2021	https://bscw.5g-ppp.eu/pub/bscw.cgi/d424095/5G%20European%20Annual%20Journal%202021.pdf
6	5G-PPP	European Vision for the 6G Network Ecosystem	June 2021	https://5g-ppp.eu/wp-content/uploads/2021/06/WhitePaper-6G-Europe.pdf
7	5G-PPP	Phase 3 Projects Brochure	June 2021	https://5g-ppp.eu/wp-content/uploads/2021/06/5GPPP_Phase3_Brochure_v7.2-web.pdf
8	5G-PPP/TMV WG	Understanding the Numbers-Contextualization and Impact Factors of 5G Performance Results	July 2021	https://5g-ppp.eu/wp-content/uploads/2021/08/TMV-Results-Explanation-White-Paper-V1.0.pdf
9	5G-PPP	“5GENESIS: Mobile Video Public Safety” – 5G Infrastructure PPP Trials and Pilots Brochure n°3	August 2021	https://5g-ppp.eu/wp-content/uploads/2021/10/5GInfraPPP_1_OTPs_Brochure2021_v1.0.pdf
10	5G-PPP	“5G Ecosystems”	September 2021	https://5g-ppp.eu/wp-content/uploads/2021/09/White_paper_5G-Ecosystems_1-0-final.pdf
11	5G-PPP	“View on 5G Architecture” #4	November 2021	https://5g-ppp.eu/wp-content/uploads/2021/11/Architecture-WP-V4.0-final.pdf

Table 9. White Papers

4.2.5. Workshops, Special Sessions and Meetings organized/co-organized – Period 3

In this third period of the 5GENESIS project, members of the consortium participated in several workshops. Unfortunately, due to the COVID-19 impact the organization of workshops was severely affected since most events either reduced their activities, turned into virtual events,

or were cancelled. In many cases, even as a virtual event, the workshop's activity was significantly reduced. However, partners of 5GENESIS were capable to participate in some of them. Table 10 summarizes the above-mentioned activities and then each activity is described in more details.

Workshops, Special Sessions and Meetings			
	Event	Date/Location	Workshop/Special Session Name
1	RunEL	7-8/9/2020, Israel	Workshop on Machine Learning for Communications (MLCOM) 53rganized by WIN consortium in Israel (under the Israeli Innovation Authority)
2	5G Experimentation Facilities and Vertical Trials: Current Status and Future Perspectives	14 October 2020, Athens	5G Trials in Europe – 5G Experimentation Facilities and Vertical Trials online workshop organized by NCSRD, 5GENESIS and 5G!Drones, more at: 5g-ppp.eu/event/5g-experimentation-facilities-and-vertical-trials
3	LMI AI/ML bootcamp	24 November 2020	Containerised Analytics Bootcamp Tutorial, 24 Nov 2020, Athlone, Ireland
4	5G-PPP Technology Board e-Workshop, session " Working on Verticals"	10/12/2020	Dr. Harilaos Koumaras (NCSRD), 5GENESIS coordinator, presented online the "Field Trials of UAVs on top of 5GENESIS platform: Advances and Lessons Learned" at 5G-PPP Technology Board e-Workshop, session " Working on Verticals"
5	UPTIME 2021 – The Annual Private 5G & LTE World Community Conference	27 January 2021, Italy	Athonet hosted a free of charge conference to celebrate 10 years of the Private LTE industry. Next decade of Private 5G with abundant shared and unlicensed spectrum for deployment, invited speakers from end-user Industries, mobile network operators, specialist operators, cloud hyperscalers, and device manufacturers. Dr. Daniele Munaretto presented 5GENESIS activities in the scope of future private networks.
6	ICIN 2021, 24 th Conference on Innovation in Clouds, Internet and Network	1-4 March 2021	Online workshop co-organized by 5GENESIS entitled "Validation Trials for 5G-based IoT Solutions Workshop (5GIoTtrials 2021)"
7	ITU-ETSI-IEEE	15-16 March 2021	Joint SDOs Brainstorming Workshop on Testbeds Federations for 5G and Beyond
8	ACM SIGCOMM 2021	23 August 2021	Workshop on 5G Measurements, Modeling, and Use Cases (5G-MeMU)
9	"Securing Future Networks" in IEEE MeditCom 2021	7-10 September 2021	5GENESIS-supported Special Session on "Securing Future Networks" in IEEE MeditCom 2021. 5GENESIS is among the

			projects co-organising the Special Session on “Securing Future Networks”, in the frame of IEEE MeditCom 2021
10	IEEE MeditCom 2021	7-10 September 2021	Special Demos session co-chaired and Call for Demos session in the IEEE MeditCom 2021
11	IEEE NFV-SDN 2021	10 November 2021	7 th IEEE Conference on Network Function Virtualization and Software Defined Networks conference, (IEEE NFV-SDN 2021 workshop, 10 Nov 2021), Heraklion, Greece.

Table 10. Workshops and Special Sessions organized/co-organized by 5GENESIS

More information about the above-mentioned activities can be find below

- RunEL, 5GENESIS partner, is a member of the WIN consortium in Israel (under the Israeli Innovation Authority) which organized the “2020 Workshop on Machine Learning for Communications (MLCOM)” on 7-8 September 2020. You may learn more: https://www.ee.bgu.ac.il/~haimp/mlcom2020?fbclid=IwAR3z5KZ6-dQfp_MXnc-ffYCwdsxOlhdLtsc8fo1lotPrzuHvtQX8jyOWbs



Figure 28. MLCOM

- Dr. Harilaos Koumaras, from NCSR “Demokritos” and 5GENESIS project coordinator participated and presented at the online workshop “5G Experimentation Facilities and Vertical Trials: Current Status and Future Perspectives” organized by NCSR “Demokritos” and supported by EU projects 5GENESIS and 5G!Drones. The presentation title is: “The GENESIS of a 5G experimentation facility, 5th Generation End to end network, Experimentation, System Integration and Showcasing”. And you can watch it online at 5GENESIS YouTube channel: <https://www.youtube.com/watch?v=FqgZMm52CEI>



Figure 29. 5G Experimentation Facilities and Vertical Trials

- **5G-PPP Technology Board e-Workshop, session " Working on Verticals"**

5G-PPP Technology Board e-Workshop to celebrate 10 years of the Private LTE industry. Next decade of Private 5G with abundant shared and unlicensed spectrum for deployment, invited speakers from end-user Industries, mobile network operators, specialist operators, cloud hyperscalers, and device manufacturers.

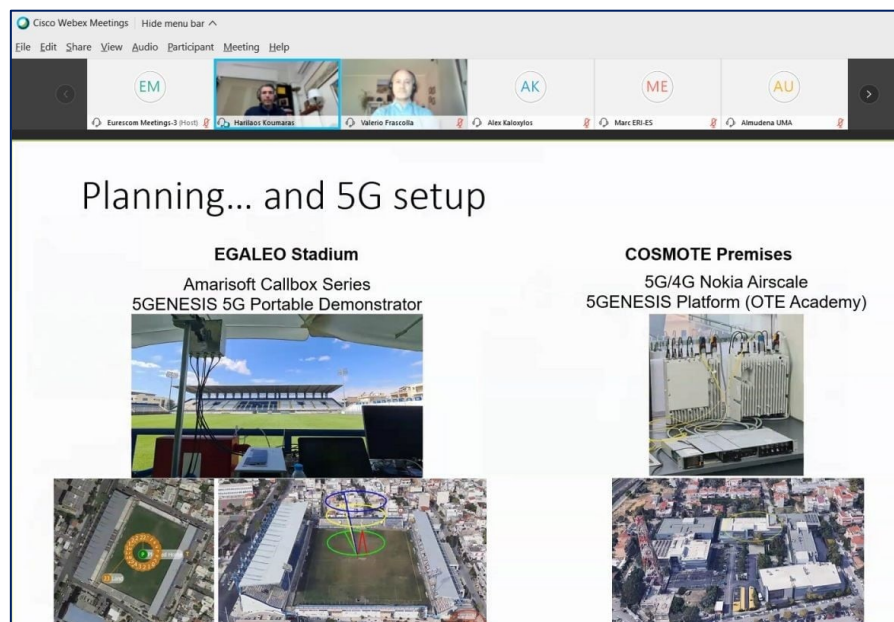


Figure 30 5G-PPP Technology Board e-Workshop, session "Working on Verticals"

- **UPTIME conference**

On 27th & 28th January 2021, 5GENESIS partner Athonet hosted the first edition of the UPTIME conference at Villa Griffone, Italy, where Guglielmo Marconi made his first wireless transmission. The conference is free of charge and celebrates 10 years of the Private LTE industry. The aim of the event was to look forward to the next decade of Private 5G with abundant shared and unlicensed spectrum for deployment. Invited speakers came from end-user Industries, mobile network operators, specialist operators, cloud hyperscalers, and device manufacturers. More information at: <https://5genesis.eu/uptime-conference-at-villa-griffone-italy-27-1/>.



Figure 31. UPTIME conference

- **ICIN 2021**

Online workshop co-organized by 5GENESIS entitled “Validation Trials for 5G-based IoT Solutions Workshop (5GiotTrials 2021)”



Figure 32. ICIN 2021

- **ITU-ETSI-IEEE**

Joint Standards Developing Organizations (SDO) Brainstorming Workshop on Testbeds Federations for 5G and Beyond: ITU-T, ETSI and IEEE are major SDO working on the topic of Testbeds for 5G and Beyond. Part of the objectives of this Workshop was to help identify and communicate the roles of the various stakeholders. The Workshop also sought to engage the various Stakeholders to discuss the roles the various Stakeholders can play in the desired Ecosystem to be built by the SDOs.



Figure 33. Joint SDOs Brainstorming Workshop on Testbeds Federations for 5G and Beyond

- **ACM SIGCOMM 2021**

The SIGCOMM workshop on 5G Measurements, Modelling, and Use Cases (5G-MeMU) ran on August the 23rd from 19:40 to 24:00 CEST. The organization of the workshop was supported by 5GENESIS and two 5GENESIS partners presented material related to two accepted papers. You may learn more about the event here: <https://conferences.sigcomm.org/sigcomm/2021/> and in the presentations Section 4.2.6.

ACM SIGCOMM 2021 Workshop on 5G Measurements, Modeling, and Use Cases (5G-MeMU)

The workshop has an associated Slack channel for discussions. Click on the link below to visit it. If you're asked to sign in, please use [this link](#).

[Go to workshop Slack channel](#)

Workshop program

Filter items...

Monday, August 23, 2021 EDT	
1:40 - 1:50 pm EDT	Opening
1:40 - 1:50 pm EDT	Opening Remarks Speakers: Workshop co-chairs
1:50 - 2:50 pm EDT	Session 1: Measurements and Data Processing Session chair: Ying Wang
Experimentation and 5G KPI measurements in the 5GENESIS platforms Georgios Xylouris (NCSR Demokritos), Maria Christopoulou (NCSR Demokritos), Harilaos Koumaras (NCSR Demokritos), Michail-Alexandros Kourtis (NCSR Demokritos), Marc Emmelmann (Fraunhofer Institute for Open Communication System FOKUS), Dionysia Triantafyllou (5G Innovation Centre - 5GIC), Yogarajam Rahulan (5G Innovation Centre - 5GIC), Ivan Gonzalez Muriel (Universidad de Málaga), Almudena Diaz Zayas (Universidad de Málaga), Eneko Abutelegi (Inemert Solutions SL), Georgios Gardikis (Space Hellas (Cyprus) Ltd.), Dimitrios Lioprasitis (Space Hellas (Cyprus) Ltd.), Dimitris Tsolkas (FOGUS Innovations & Services P.C), Panagiotis Kostakis (FOGUS Innovations & Services P.C), Erik Aumayr (Ericsson LMI Research Centre), Anne-Marie Bosneag (Ericsson LMI Research Centre), Ozgu Alay (University of Oslo), Valerio Frascolla (Intel), and Anna Brunstrom (Karlstad University)	
Improving Railway Track Coverage with mmWave Bridges: A Measurement Campaign Adrian Schumacher (Swisscom (Switzerland) Ltd.), Nina Jamaly (Swisscom (Switzerland) Ltd.), Ruben Merz (Swisscom (Switzerland) Ltd.), and Andreas Burg (Ecole polytechnique fédérale de Lausanne (EPFL))	
Learning from Large-scale Commercial Networks: Challenges and Knowledge Extraction towards Machine Learning Use Cases Roman Zhohov (Ericsson Research), Alexandros Palaios (Ericsson Research), and Philipp Geuer (Ericsson Research)	
2:50 - 3:00 pm EDT Break	
3:00 - 4:00 pm EDT	Session 2: 5G Systems and Applications Session chair: Anna Brunstrom
Extending Network Slice Management to the End-host Alexander Rablisch (Karlstad University), George Xilouris (NCSR Demokritos), Themistoklis Anagnostopoulos (NCSR Demokritos), Karl-Johan Grinnemo (Karlstad University), Thanos Sarlas (NCSR Demokritos), Anna Brunstrom (Karlstad University), Ozgu Alay (University of Oslo, Simula Metropolitan), and Giuseppe Caso (Simula Metropolitan)	

Figure 34. ACM SIGCOMM 2021

- **“Securing Future Networks” in IEEE MeditCom 2021**

5GENESIS-supported Special Session on “Securing Future Networks” was held at the IEEE MeditCom 2021 conference (7-10 September 2021). 5GENESIS was among the projects co-organising the Special Session on “Securing Future Networks”. More information is available at: <https://5genesis.eu/call-for-papers-ieee-meditcom-2021/>.



Figure 35 IEEE MeditCom 2021

- **IEEE MeditCom 2021 Special Demos session**

Demo session co-chaired by Dr. Harilaos Koumaras (NCSRDI). Summaries of accepted demos included in the IEEE MeditCom 2021 Proceedings. You may find more information here: <https://meditcom2021.ieee-meditcom.org/authors/call-for-demos/>.



Figure 36 IEEE MeditCom 2021

- **IEEE NFV-SDN 2021**

The 7th IEEE Conference on Network Functions Virtualization and Software-Defined Networking (IEEE NFV-SDN 2021) was a virtual event in 2021. The conference took place online from 9-11 November 2021. You may find more information here: <https://nfvsdn2021.ieee-nfvsdn.org/>.



Figure 37 IEEE NFV-SDN 2021

4.2.6. Presentations in Conferences, Workshops, InfoDays, Forums – Period 3

During Period 3, 5GENESIS partners participated in various events, such as workshops, conferences, and info days, presenting 5GENESIS results. The table below shows the Period 3 presentations along with their date/location and titles. Most of these presentations were delivered remotely since due to the COVID-19 impact and related restrictions.

5GENESIS Presentations			
	Event	Date/Location	Title
1	6G Research Visions Webinar Series	16/9/2020	Dr. Harilaos Koumaras from NCSRD, 5GENESIS project coordinator, participated and presented “MNO Openness: The Next Business Opportunity”
2	“5G Experimentation Facilities and Vertical Trials”	4/10/2020	Dr. Harilaos Koumaras (NCSR Demokritos), 5GENESIS coordinator, presented 5GENESIS project at the “5G Experimentation Platforms (5G-PPP ICT-17 Projects)” session of the “5G Experimentation Facilities and Vertical Trials” online workshop, co-organized by the Institute of Informatics & Telecommunications of NCSR Demokritos, 5GENESIS, 5G!Drones and 5G-PPP
3	“Xchanging Ideas – Global 5G Evolution”	8/12/2020	“5G-enabled UAVs” presentation by Dr. Harilaos Koumaras at “Xchanging Ideas – Global 5G Evolution” online event (8 Dec 2020)
4	5G-PPP Technology Board e-Workshop, session “Testing: Methodologies and Setup”	10/12/2020	Almundena Diaz Zayas (UMA), 5GENESIS partner, presented online the “5GENESIS: 5G performance experimentation and trials:key results and lessons learned” at 5G-PPP Technology Board e-Workshop, session “Testing: Methodologies and Setup”
5	LMI Tech Day 2020	10/12/2020	Anne-Marie Bosneag, Erik Aumayr (LM Ericsson Ireland) presented 5GENESIS and its microservice analytics architecture & demo
6	5G-PPP Technology Board e-	10/12/2020	Dr. Harilaos Koumaras (NCSRD), 5GENESIS coordinator, presented online the “Field Trials of UAVs on top of 5GENESIS platform: Advances and Lessons Learned” at 5G-

	Workshop, session "Working on Verticals"		PPP Technology Board e-Workshop, session "Working on Verticals"
7	5G Architecture WG	11/12/2021	5GENESIS partner Jesús Gutiérrez (IHP) presented the 5GENESIS architecture on December 11, 2020 on the 5G Architecture Working Group
8	5G and Internet of Things Thessaloniki Week 2020	14/12/2020	Dr. Harilaos Koumaras (NCSRD), 5GENESIS coordinator, presented today at the "5G and Internet of Things Thessaloniki Week 2020" how 5G-enabled UAVs can support the IoT vertical industry, based on the work that is performed in 5GENESIS and 5G!Drones 5G-PPP projects.
9	Drones 3S Pro online conference	27/1/2021	"5G!Drones Trials in Athens: Results, Challenges and the Next Steps" by Dr. Harilaos Koumaras (NCSRD), 5GENESIS coordinator
10	SEMANTIC project – School 1 virtual session: 5G architectures, enabling technologies, vertical industries and KPIs	16/2/2021	Dr. Harilaos Koumaras (NCSRD), 5GENESIS coordinator, presented the "5G system and Vertical Industries KPIs" with focus on Open5Genesis Suite
11	ITU-ETSI-IEEE Joint SDOs Brainstorming Workshop on Testbeds Federations for 5G and Beyond	15-16 March 2021	5GENESIS representatives participated and presented in this workshop which provided a platform for ETSI, ITU-T and IEEE to Brainstorm and share ideas on Testbeds Federation Challenges, including: the Testbeds Federation Reference Model being jointly standardized by ETSI and ITU
12	5G FORUM 2021	4-6 May 2021	5GENESIS Malaga 5G experimental platform was presented by Prof Pedro Merino Gomez
13	EuCNC2021	8-11 June 2021	Space Hellas presented at EuCNC2021 "Metrics-based Outlier Detection for 5G Security" on Tuesday 8 June 2021, in the frame of 5GENESIS Project and PALANTIR Project
14	1st Athens Space and Satellite Industry Summit	7-8 July 2021	5GENESIS activities related to Satcom & 5G presented by Georgios Gardikis (Space Hellas)
15	ACM SIGCOMM 2021 (5G-MeMU workshop)	23 August 2021	"Experimentation and 5G KPI measurements in the 5GENESIS platforms" presented by George Xilouris (NCSRD)
16	ACM SIGCOMM 2021 (5G-MeMU workshop)	23 August 2021	"Extending Network Slice Management to the End-host" presented by Alexander Rabitsch (KAU)

17	IEEE MeditCom 2021	7-10 September 2021	Field Trial of UAV flight with Communication and Control through 5G cellular network
18	IEEE MeditCom 2021	7-10 September 2021	Presentation of the Limassol platform by Space Hellas and supported by Primetel PLC, Avanti Communications and UP Valencia
19	5GIA-TSDSI Webinar on 5G Trials & Pilots	22 September 2021	Prof. Pedro Merino (5GENESIS Technical Manager, University of Malaga) presented the 5GENESIS Malaga platform (including a demo video) during the 5G Smart City session of the 5GIA-TSDSI Webinar on 5G Trials & Pilots, 22 September 2021
20	IEEE SmartNets	22-23 September 2021	Dr. Alejandro Fornés (UPV), 5GENESIS partner, presented the paper "Deployment of 5G Experiments on Underserved Areas Using the Open5GENESIS Suite" at IEEE SmartNets, 22-23 September 2021, Glasgow, Scotland
21	17th Annual 5G World	21-23 September 2021	Panel participation of Pedro Merino (UMA) entitled "5G World – Putting 6G in perspective" at 17th Annual 5G World (21-23 September 2021, London and online)
22	TCCA - Critical Communication World 2021 (CCW2021)	3-5 November 2021	Presentation of demonstration of the interworking of 5G MCX with the DMR system, the one used by Malaga Police, and also part of the 5GENESIS Malaga platform trials.
23	5G Techritory	22-25 November 2021	Harilaos Koumaras (NCSR "DEMOKRITOS"), 5GENESIS project coordinator, presented insightful details about the progress of the project.
24	Infocom World 2021	24-26 November 2021	Harilaos Koumaras (NCSR "DEMOKRITOS"), 5GENESIS project coordinator, presented "5GENESIS: Results and Lessons Learnt" in the The Infrastructure – 5G Experimentation and Trials session of Infocom world 2021

Table 11. Presentations in Conferences, Workshops, InfoDays, Events

Several of the above-mentioned events-presentations are analysed in more detail here below.

- **6G Research Visions Webinar Series**

Dr. Harilaos Koumaras (NCSR Demokritos) participated and presented "MNO Openness: The Next Business Opportunity" Find out the video presentation here: <https://www.youtube.com/watch?v=4ebFm1qdgC0>.

European Platforms for 5G Vertical Experimentation

- 5GENESIS Facility: Five 5G Testbeds in Europe
- 5GENESIS will evaluate 5G KPIs for various 5G use cases and new services, in both controlled set-ups and large-scale events.
- 5GENESIS has built the Open5GENESIS Suite that provides a common API for testing and experimentation of new services by vertical industries
- Other European testbeds include 5G-EVE and 5G-VINNI

Logos: 5Genesis, Open5Genesis SUITE

Figure 38. 6G Research Visions Webinar Series

- “5G Experimentation Facilities and Vertical Trials”

Dr. Harilaos Koumaras (NCSR Demokritos) presented 5GENESIS project at the “5G Experimentation Platforms (5G-PPP ICT-17 Projects)” session of the “5G Experimentation Facilities and Vertical Trials” online workshop, co-organized by the Institute of Informatics & Telecommunications of NCSR Demokritos, 5G-PPP, and the projects 5GENESIS and 5G!Drones. The video can be found at: <https://www.youtube.com/watch?v=FqqZMm52CEI>.



Figure 39. 5G Experimentation Facilities and Vertical Trials

- “Xchanging Ideas – Global 5G Evolution”

Dr. Harilaos Koumaras (NCSR Demokritos), participated in the online event "Xchanging Ideas - Global 5G Evolution" on 8th of December 2020, presenting the trial field results of 5G-enabled UAVs that were performed in the framework of the 5G!Drones Project on top of the 5GENESIS Project experimental 5G infrastructure. The event was broadcasted through Xchanging Ideas - Global 5G Evolution YouTube channel at: <https://www.youtube.com/watch?v=el9ZhXa-Ccw>

XCHANGING IDEAS #9

Global 5G Evolution

8th DECEMBER 2020

8:00 AM GMT
4:00 PM SGT

Click SUBSCRIBE Button for FREE

<https://www.youtube.com/c/Global5GEvolution>

Agenda:

16:00- 16:10 MYT	Kaneshwaran- Kuala Lumpur, Malaysia	<ul style="list-style-type: none"> - 5G Private Network Europe Industry Use Cases - FWA & B2B 5G Slicing Private Network Business Model - 5G Private Network Spectrum Regulatory - FWA Business Model 5G Private Network - O-RAN Architecture to boost 5G Private Networks - 5G & AI in Private Network - Field Trials of 5G enabled UAVs on Private Infrastructure - 5G Private Network Use Cases - Q&A - Closing
16:10- 16:20 MYT	Mohamed Radwan, Sydney, Australia	
16:20- 16:30 MYT	David Gallegos, Guadalajara, Mexico	
16:30- 16:40 MYT	Paul Jesemann, Singapore	
16:40- 16:50 MYT	Abel Mayal, Barcelona, Spain	
16:50- 17:00 MYT	Rajesh Mishra, Nashua, New Hampshire, US	
17:00- 17:10 MYT	Prof Dr Harilaos Koumaras, Athens, Greece	
17:10- 17:20 MYT	Amir Hashmi London, UK	
17:20- 17:30 MYT	Q&A	
17:30- 17:35 MYT	Kaneshwaran- Kuala Lumpur, Malaysia	

LIVE

Figure 40. "Xchanging Ideas - Global 5G Evolution"

- **5G-PPP Technology Board e-Workshop, session “Testing: Methodologies and Setup”**

Dr. Almudena Diaz Zayas of the University of Malaga, 5GENESIS partner, presented online the "5GENESIS: 5G performance experimentation and trials: key results and lessons learned". This presentation was part of the 5G-PPP Technology Board e-Workshop, session "Testing: Methodologies and Setup", held on the 10th of December 2020.



Figure 41. 5G-PPP Technology Board e-Workshop

- **5G-PPP Technology Board e-Workshop, session “Working on Verticals”**

Dr. Harilaos Koumaras (NCSR), 5GENESIS coordinator, presented online the "Field Trials of UAVs on top of the 5GENESIS platform: Advances and Lessons Learned" at 5G-PPP Technology Board e-Workshop, session "Working on Verticals", on the 10th of December 2020.

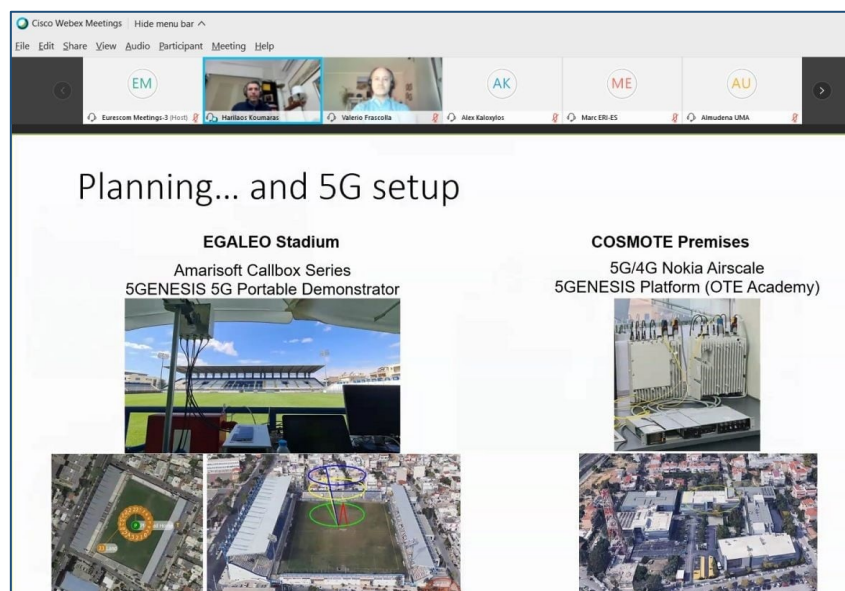


Figure 42. 5G-PPP Technology Board e-Workshop

- **LMI Tech Day 2020**

Anne-Marie Bosneag and Erik Aumayr presented the 5GENESIS architecture, focusing on the Analytics Services that are part of the Coordination Layer and the Policy Engine, which is part of the Slice Manager. A demo of the Analytics Services was also presented.

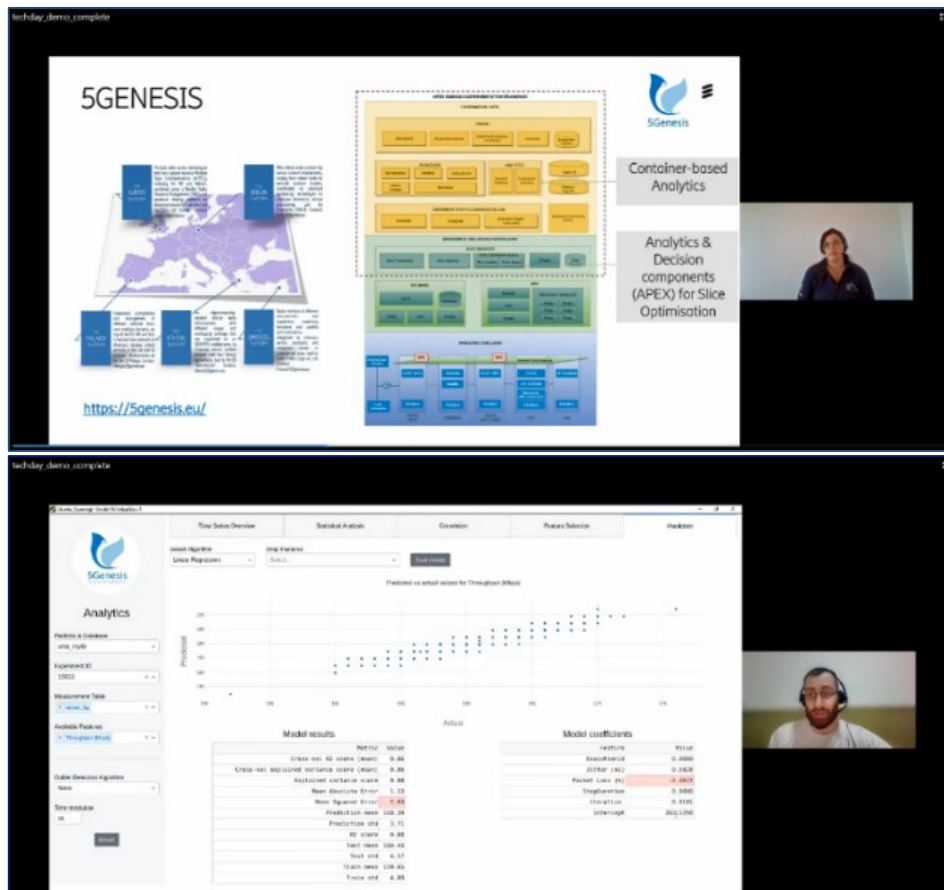


Figure 43 LMI Tech Day 2020

- 5GENESIS presentation on 5G Architecture WG

5GENESIS partner Jesús Gutiérrez (IHP) presented the 5GENESIS architecture at the 5G Architecture 5G-PPP Working Group which took place on December 11, 2020.

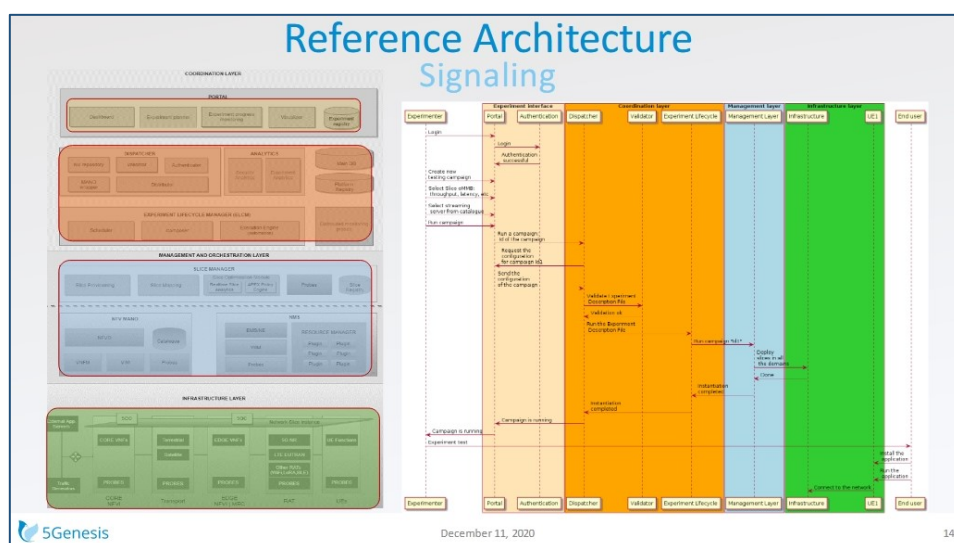


Figure 44 5G Architecture WG Presentation

- **5G and Internet of Things Thessaloniki Week 2020**

Dr. Harilaos Koumaras (NCSR-D), 5GENESIS coordinator, presented on the 14th of December at the "5G and Internet of Things Thessaloniki Week 2020" how 5G-enabled UAVs can support the IoT vertical industry, based on the work that is performed in 5GENESIS and 5G!Drones. More information available at: <https://www.ihu.gr/ucips/post-3399>.



Figure 45. 5G and Internet of Things Thessaloniki Week 2020

- **Drones 3S Pro online conference**

Dr. Harilaos Koumaras from NCSR-D, 5GENESIS project coordinator, participated and presented in the Drones Pro 3s forum in Greece. He shared the scope and the objectives of 5GENESIS along with details from the collaboration with the 5G!Drones project.



Figure 46. Drones Pro 3s forum

- **SEMANTIC project – School 1 virtual session: 5G architectures, enabling technologies, vertical industries and KPIs**

Dr. Harilaos Koumaras (NCSR-D), 5GENESIS project coordinator, presented the "5G system and Vertical Industries KPIs" with focus on Open5Genesis Suite at SEMANTIC project - School 1

virtual session: 5G architectures, enabling technologies, vertical industries and KPIs on 16 February 2021.



Figure 47. SEMANTIC project

- ITU-ETSI-IEEE Joint SDOs Brainstorming Workshop on Testbeds Federations for 5G and Beyond

5GENESIS representatives participated and presented in this workshop which provided a platform for ETSI, ITU-T and IEEE to Brainstorm and share ideas on Testbeds Federation Challenges, including the Testbeds Federation Reference Model being jointly standardized by ETSI and ITU.



Figure 48. SDOs Brainstorming Workshop

- 5G FORUM 2021

5GENESIS Malaga 5G experimental platform was presented by Prof Pedro Merino Gomez, 5GENESIS Technical manager, at the 5G-FORUM. "Malaga already has a safe testing environment for 5G" was stated.



Figure 49. 5G-FORUM

- **EuCNC2021**

Space Hellas presented at EuCNC 2021 "Metrics-based Outlier Detection for 5G Security" on Tuesday 8 June 2021, in the frames of the 5GENESIS and the PALANTIR projects.

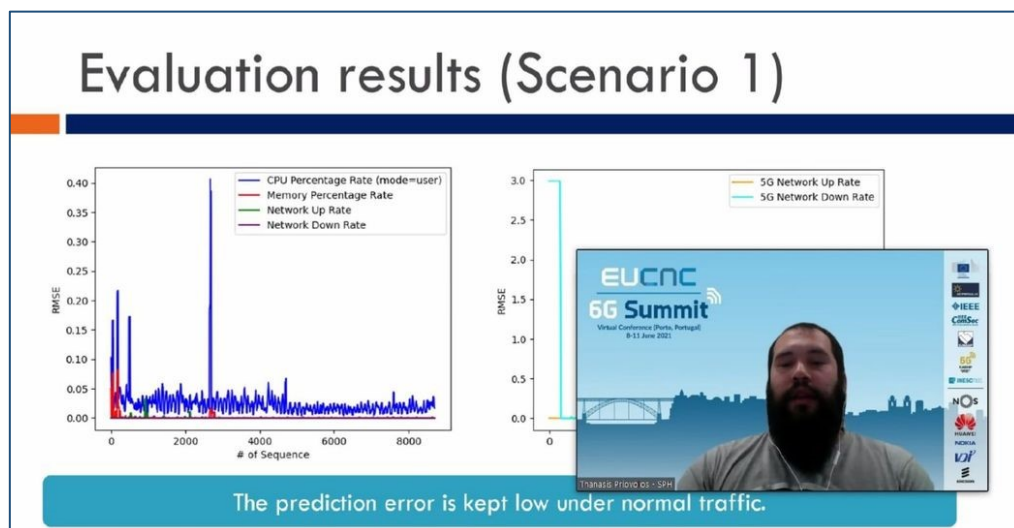


Figure 50. EuCNC 2021

- **1st Athens Space and Satellite Industry Summit**

Georgios Gardikis (Space Hellas) presented the 5GENESIS activities around Satcom & 5G during the 1st Athens Space and Satellite Industry Summit (7-8 July 2021).

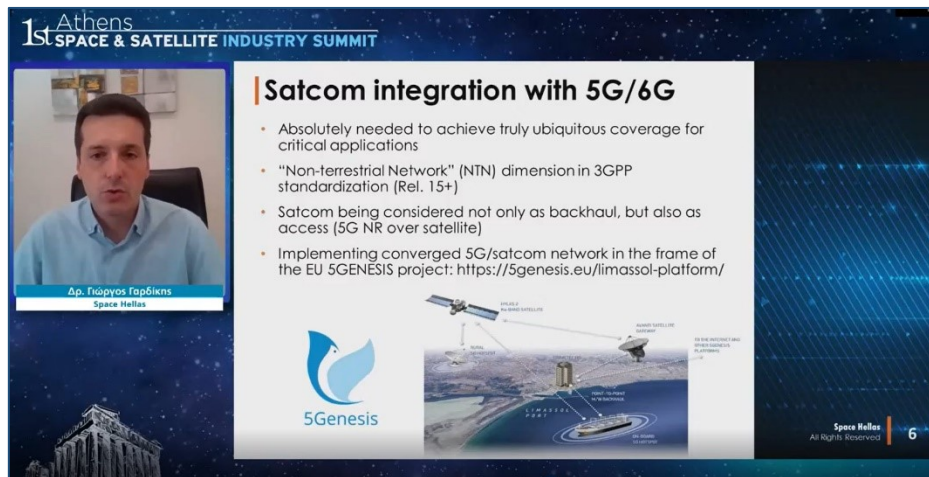


Figure 51. 1st Athens Space and Satellite Industry Summit

- ACM SIGCOMM 2021 (5G-MeMU workshop)

5GENESIS partner George Xilouris (NCSR "DEMOKRITOS") presented the 5GENESIS paper entitled "Experimentation and 5G KPI measurements in the 5GENESIS platforms" at the 5G-MeMU workshop of ACM SIGCOMM 2021 (23 August 2021).

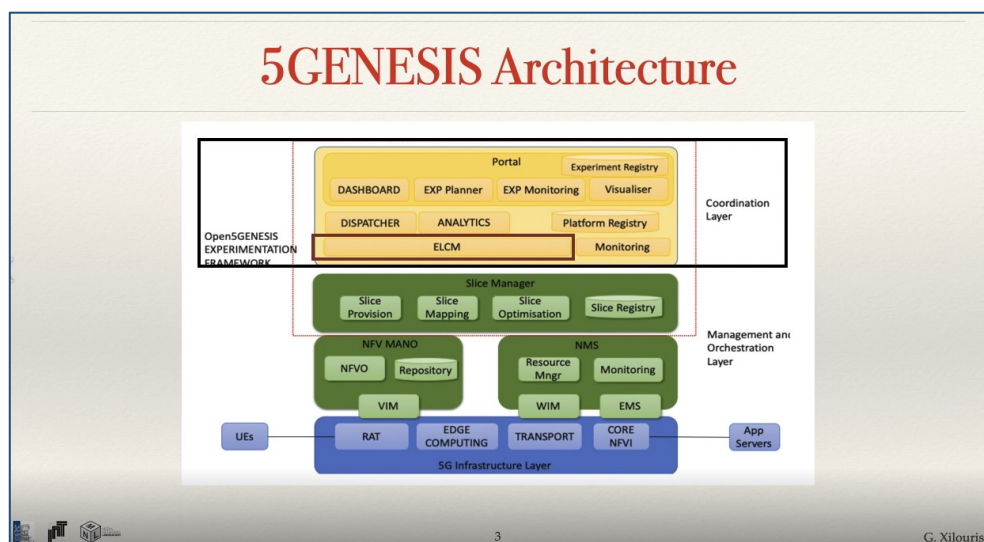


Figure 52. ACM SIGCOMM 2021 presentation at 5G-MeMU by NCSR

- ACM SIGCOMM 2021 (5G-MeMU workshop)

5GENESIS partner Alexander Rabitsch (KAU) presented the 5GENESIS paper entitled "Extending Network Slice Management to the End-host" at the 5G-MeMU workshop of ACM SIGCOMM 2021 (23 August 2021).

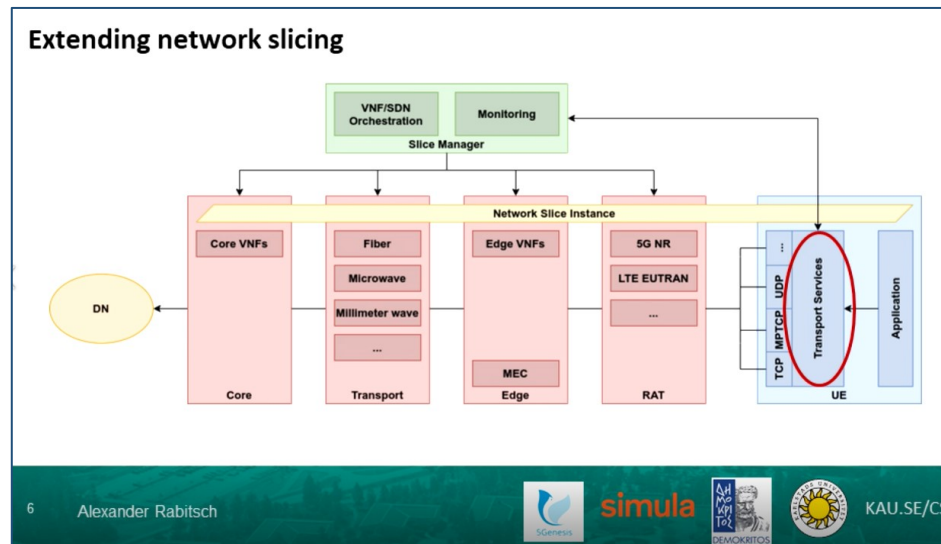


Figure 53. ACM SIGCOMM 2021 presentation at 5G-MeMU by KAU

- IEEE MeditCom 2021

5GENESIS partner Dimitrios Fragkos (NCSR "DEMOKRITOS") presented the conference paper entitled "5G Vertical Application Enablers Implementation Challenges and Perspectives" at the IEEE MeditCom 2021 which took place in Athens on 7-10 September 2021.



Figure 54. 5G Vertical Application Enablers Implementation Challenges and Perspectives

- IEEE MeditCom 2021

Demo of satellite edge computing, as implemented in the Limassol platform of the 5GENESIS project. Presented by Space Hellas and supported by Primetel PLC, Avanti Communications and UP Valencia during the IEEE MeditCom 2021 (International Mediterranean Conference on Communications and Networking), 7-10 September 2021, Athens, Greece. You may access the video presentation here: https://youtu.be/cesMJ_URrCM.

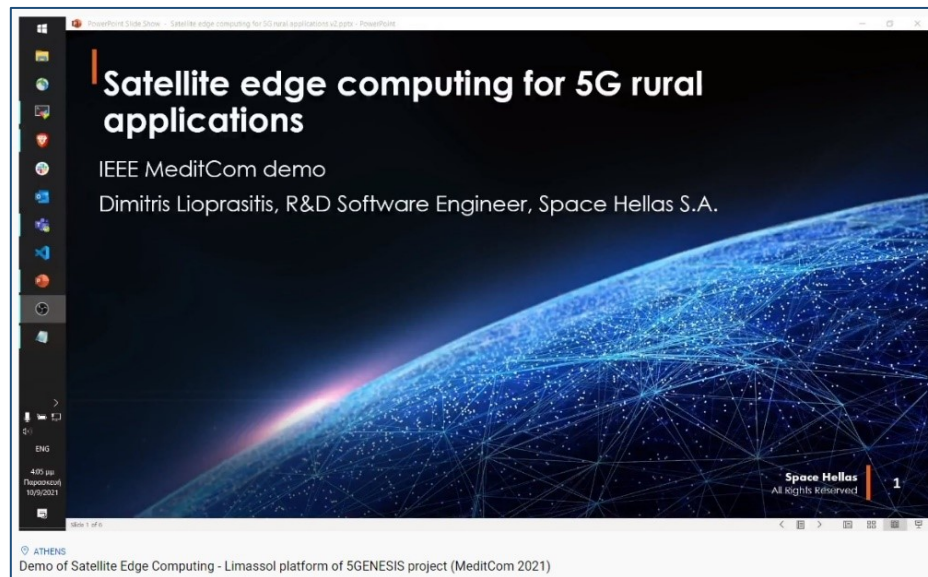


Figure 55 IEEE MeditCom 2021 - Demo of satellite edge computing

- 5GIA-TSDSI Webinar on 5G Trials & Pilots

The 5GENESIS partner (UMA), Prof. Pedro Merino, presented the 5GENESIS project in the 5GIA-TSDSI Online webinar on 5G Tests and Pilots. You may find the video-recording and the presentations here: <https://5g-ppp.eu/event/5gia-tdsdi-online-webinar-on-5g-tests-and-pilots/>.

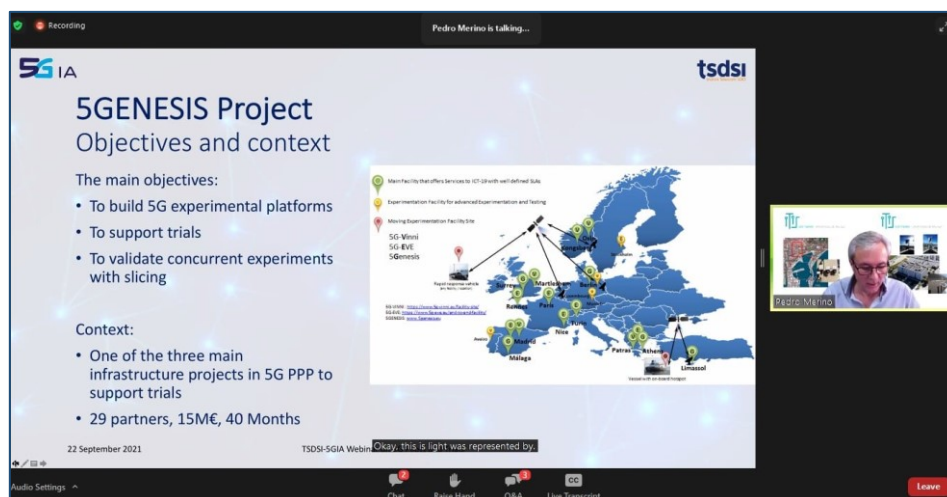


Figure 56. 5GIA-TSDSI Online webinar

- IEEE SmartNets

Alejandro Fornés (UPV), 5GENESIS partner, presented the paper “Deployment of 5G Experiments on Underserved Areas Using the Open5GENESIS Suite at IEEE SmartNets, 22-23 September 2021, Glasgow, Scotland. Find more information here: <https://smartnets.ieee.tn/>.



Figure 57. IEEE SmartNets

- **17th Annual 5G World**

Panel participation of Pedro Merino (UMA) entitled “5G World – Putting 6G in perspective” at the 17th Annual 5G World (21-23 September 2021, London and online) You may learn more here: <https://tmt.knect365.com/5gworldevent/>.



Figure 58. 17th Annual 5G World

- **TCCA - Critical Communication World 2021**

Demonstration of the interworking of 5G MCX with the DMR system, the one used by Malaga Police nowadays and part also of the Malaga platform trials. You may learn more about the event here: <https://www.youtube.com/watch?v=Qp0aZksG5HU>.



Figure 59 TCCA Critical Communication World 2021

- 5G Techritory 2021

Dr. Harilaos Koumaras (NCSR DEMOKRITOS), 5GENESIS project coordinator, presented insightful details about the progress of the project. More information available here: <https://www.5gtechritory.com/>.



Figure 60 5G Techritory 2021

- Infocom World 2021

Dr. Harilaos Koumaras (NCSR DEMOKRITOS), presented (in Greek) insightful details about the 5GENESIS architecture, trials and the progress of the project. More information available here: <https://infocomworld.gr/home-2021/>.

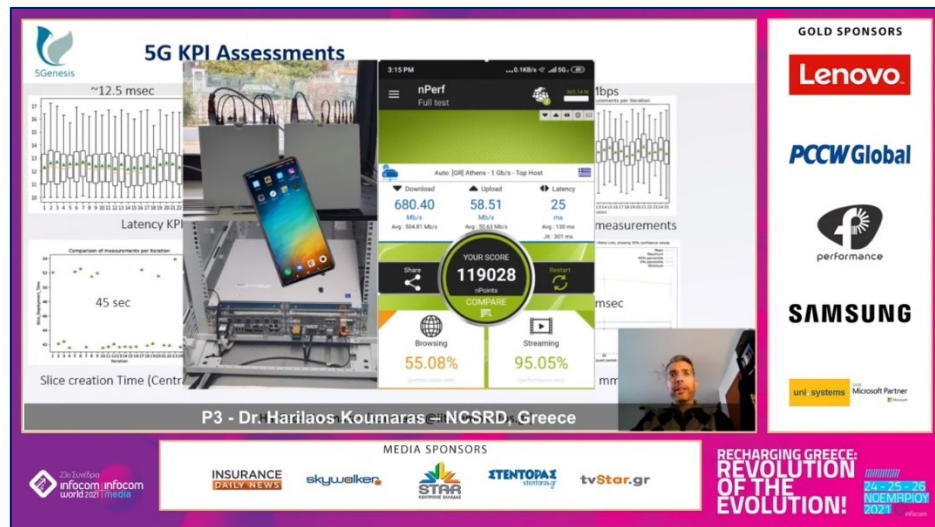


Figure 61 Infocom world 2021

4.2.7. Participation in Conference Panels and Invited Talks - Period 3

Table 12 summarizes 5GENESIS participation in conference panels, invited talks at conferences, and workshops, followed by a detailed information on each activity.

Conference Panels and Invited Talks			
	Title	Event	Date/Location
1	Invited Talk "THz Communication: An enabler for 6G?"	Third Workshop 'Towards THz Communications'	3 March 2021
2	Industrial Panel "Industrial future of THz comms"	Third Workshop 'Towards THz Communications'	3 March 2021
3	Q&A session	5G FORUM	4-6 May 2021
4	Panel "Network Intelligence for the future"	MedComNet 2021	17 June 2021
5	Panel "IoT Evolutionary Computing Concepts"	IoT Week 2021	30 August 2021
6	5G World - Putting 6G in perspective	17th Annual 5G World	21-23 September 2021
7	Panel "AIOTI Advancing European IoT and Edge Computing Research and Innovation. Priorities and Synergies across Horizon Europe Partnerships"	AIOTI Signature event	30 November 2021

8	Industrial Panel “Industrial IoT: key technology enablers for its evolution”	GLOBECOM 2021	08 December 2021
9	"5GENESIS key findings" during the 5G PPP Infrastructure Projects–Key findings session at 5G Techritory-Europe's Leading 5G Ecosystem Forum	5G Techritory	22 November 2021
10	Multi-connectivity in a 5G and beyond network landscape	ACM CoNEXT conference	10 December 2021

Table 12. Participation in Panels and Invited Talks

- **Third Workshop ‘Towards THz Communications’ – Invited talk**

Dr. Valerio Frascolla was invited to give a talk that elaborated on some factors related to THz communication, taking the Berlin platform as a starting point to show that in Europe there are testbeds that are capable of mmwave and are suited for being extended in the mid-long term to support THz capabilities. More information available here: <https://ec.europa.eu/digital-single-market/en/news/third-towards-terahertz-communications-workshop>.



Figure 62 Third Workshop ‘Towards THz Communications’

- **Third Workshop ‘Towards THz Communications’ - Panel**

Dr. Valerio Frascolla was invited to the Industrial Panel of the III Workshop 'Toward THz communications' to discuss 5GENESIS involvement in mmwave and THz communications. More information available here: <https://digital-strategy.ec.europa.eu/en/events/third-towards-terahertz-communications-workshop>.

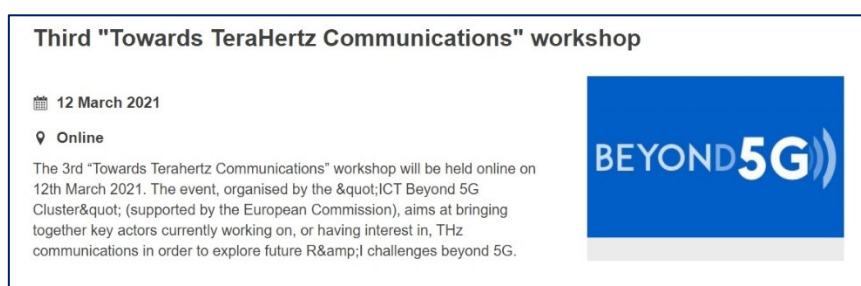


Figure 63 Third Workshop ‘Towards THz Communications’

- **Q&A session @ 5G FORUM**

Prof. Pedro Merino Gomez from University of Málaga (5GENESIS Technical manager) and David Artunedo from Telefónica (5GENESIS key partner) participated at the LIVE session of answering questions from attendees of the 5GForum in <https://virtual.5gforum.es/inicio.aspx>.



Figure 64 Q&A session @ 5G FORUM

- **MedComNet - Panel “Network intelligence for the future”**

The Panel was organized by Prof. Anna Brunstrom (Karlstad University), driven by Prof. Pedro Merino (UMA) and attended by Dr. Ozgu Alay (Oslo University) and Dr. Valerio Frasca (Intel), all 5GENESIS partners. The discussion lasted 90 minutes and focused on providing different views on how the networks are going to evolve in the next few years. 5GENESIS members discussed the findings out of the project and disseminated project results with an audience that counted more than 50 attendees (Live attendance during the Panel). More info can be found here: <https://www.medcomnet.org/online-program/>.



Figure 65 MedComNet Panel

- **IoT Week 2021 – Panel “IoT evolutionary computing concepts”**

Dr. Valerio Frasca was invited to give a talk to the Panel during the IoT Week 2021, disseminating the work done by the 5GENESIS project. More info here: <https://sites.grenadine.co/sites/iot/en/iot-week-online-edition/schedule/8063/IoT%20Evolutionary%20Computing%20Concepts%20>".

IoT Evolutionary Computing Concepts

What: Panel
When: 5:45 PM, Monday 30 Aug 2021 (1 hour)
How: You must be logged in to see the requirements for this session.
[Log In](#)

Discussion: 0

Internet of things (IoT) and edge computing are advancing, allowing the computing to be performed closer to where the data is produced and apply analytics for processing the data. Adding edge processing to resource-constrained IoT devices brings new security issues and requires innovation and optimisation at the hardware, software and connectivity levels. The session gives an overview of the IoT evolutionary concepts, and the presentations focus on the challenges related to leveraging the integration of IoT, AI, edge computing, advanced intelligent wireless technologies while considering cybersecurity implications on vertical applications.






 Ovidiu Vermesan Speaker SINTEF Chief Scientist	 Valerio Frascolla Speaker Intel Director of Research and Innovation	 Panagiotis Demestichas Speaker WINGS ICT Solutions Senior Research Engineer for WINGS ICT Solutions and Professor at the University of Piraeus, School of ICT, Department of Digital Systems	 Jafar Mohammadi Speaker Nokia Bell Labs Wireless Researcher
 Thomas Krousartlis Speaker Intelcom Innovation R&D Engineer			

Figure 66 IoT Week 2021 Panel

- 5G World - Putting 6G in perspective

Prof. Pedro Merino Gomez from University of Málaga (5GENESIS Technical manager) participated at a panel discussion at 17th Annual 5G World that took place on 21-23 September 2021. You may learn more about this panel discussion and event here: <https://tmt.knect365.com/5gworldevent/agenda/1/>

5G Series > 5G World [INICIAR SESIÓN](#)

[Inicio](#) [Speakers](#) [5G World Agenda](#) [5G World Virtual Agenda](#) [Global Carrier Billing Agenda](#) [Floor Plan](#)

The road to 6G

Panel Discussion: Putting 6G in perspective

viernes, 24 de septiembre de 2021 10:40 a 11:20

The road to 6G - Free to attend

6G

Información

- Looking at 5G with a critical eye
- What learning from 5G can be taken forward to 6G?
- Which technologies will be realised within the next generation?

Format: Panel discussion

Session Type: Virtual

Ponentes











	Matti Latva-aho 6G Flagship Director Oulu University	
	Thomas Magedanz Director, Business Unit NGNI Fraunhofer Fokus	
	Bernard Barani Deputy Head of Unit, DG Connect – Future Connectivity Systems European Commission	
	Dimitris Mavrakis Research Director ABI Research	
	Pedro Merino Gomez Technical Manager 5GENESIS Project	

Figure 67 5G World - Putting 6G in perspective

- "5GENESIS key findings" during the 5G PPP Infrastructure Projects–Key findings session at 5G Techritory-Europe's Leading 5G Ecosystem Forum at 5G Techritory

Panel discussion with 3 5G-PPP ICT-17 projects (5GENESIS, 5GEVE and 5G-VINNI) during the 5G-PPP Infrastructure Projects–Key findings session at 5G Techritory-Europe's Leading 5G Ecosystem Forum at 5G Techritory which took place on November 22, 2021.



Figure 68 Panel Discussion at 5G Techritory

- AIOTI Signature event - Panel “AIOTI Advancing European IoT and Edge Computing Research and Innovation. Priorities and Synergies across Horizon Europe Partnerships”

Dr. Valerio Frasca was invited as speaker to the Panel at the AIOTI signature event 2021. The target was to share with a broad audience experiences gained in H2020 projects, and how those could provide meaningful inputs to the forthcoming Horizon Europe projects and overall future Horizon Europe Work Programmes. More info can be found here: <https://aioti.eu/aioti-signature-event-2021/>.

14.45 AIOTI Advancing European IoT and Edge Computing Research and Innovation. Priorities and Synergies across Horizon Europe Partnerships

The session will provide an overview of the AIOTI research and innovation priorities and present the trends and advancements of next-generation IoT and edge computing technologies as part of the computing continuum. The presentations and discussions will highlight the specific technological elements, the complementarities and synergies with other European partnerships that provide the mechanisms to strengthen the European value chains in intelligent IoT developments by integrating relevant technology elements of IoT, edge computing, digital twins, connectivity, artificial intelligence (AI), and cybersecurity.

Introduction: Ovidiu Vermesan, SINTEF, Chair of AIOTI Research and Partnerships WG

Moderator: Natalie Samovich, Enercutim, Chair of AIOTI Energy WG

Panelists:

Pierre-Yves Danet, Orange, Member of the Board 6G IA

Valerio Frasca, Intel, Member of the Board BDVA-DAIRO

Michael Malms, ETP4HPC/Transcontinuum Initiative

Pierre Gronlier, CTO of Gaia-X AISBL

Figure 69 Panel Discussion at the AIOTI Signature event

- **GLOBECOM 2021 - Industrial Panel “Industrial IoT: key technology enablers for its evolution”**

Dr. Valerio Frascolla drove one of the eight Industrial Panels at GLOBECOM 2021. The 90 minutes discussion focused on the impact of the latest research activities (among which also research projects) in the transformation of the Industrial IoT domain, where Edge and MEC play a big role, topics in focus of the 5GENESIS project. More info can be found here: <https://globecom2021.ieee-globecom.org/program/industry-panels>.



Figure 70 Panel Discussion at GLOBECOM 2021

- **ACM CoNEXT conference**

Dr. Anna Brunstrom (KAU) 5GENESIS partner participated in a panel discussion in the context of the CoNEXT 2021 conference sharing some useful insights about the 5GENESIS project. The presentation made was entitled “Multi-connectivity in a 5G and beyond network landscape”.



Figure 71 CoNEXT conference

4.2.8. Other Activities-Events (Exhibitions, Business Days, Booths in Conferences, Interviews, Webinars, Poster Sessions, 5GENESIS as Sponsor) - Period 3

During its lifetime, 5GENESIS organized and participated in a variety of events, including special issues, call for papers, exhibitions, forums, and tech days, with many of them including poster sessions to further enhance and promote 5GENESIS' presence. 5GENESIS was also among the sponsors of various events. Table 13 summarizes these activities during Period 3.

Other Activities - Events (Exhibitions, Business Days, Booths, Interviews, Webinars, Poster Session, Awards)			
	Activity	Event	Date/Location
1	Special Issue Call for Papers	Sensors — Open Access Journal - Special issue	15 November 2020
2	Special Issue Call for Papers	Sensors — Open Access Journal - Special issue	30 April 2021
3	5G-FORUM sponsorship	5G-FORUM	4-6 May 2021
4	Industry Forum Proposal	IEEE 7th World Forum on Internet of Things (WF-IoT)	20-24 June 2021
5	Virtual content through 5G-PPP page on MWC website a) Demo video b) Leaflet	MWC2021	28 June- 1 July 2021
6	Booth	Critical Communications World (CCW2021)	3-5 November 2021
7	Exhibition	Critical Communications World (CCW2021)	3-5 November 2021
8	Poster session	MSWIM'21	22-26 November 2021
9	Online Voting for the most favourable ICT-17 project	5G Techritory	22 November 2021

Table 13. Various Events and activities

- **Sensors — Open Access Journal - Special issue**

The 5GENESIS team of UMA lead a special issue on the journal SENSORS (ISSN 1424-8220) entitled “5G Mission-Critical Applications”. This special issue belongs to the section “Communications”. The call for papers submission deadline was at 15 November 2020. More information available here:

https://www.mdpi.com/journal/sensors/special_issues/5G_mission?fbclid=IwAR2xEVEeEKwVGwOXzMA4TeR_cYMIie-Y8J3f8bJcfPgZ0yQfCh4IAbLf-s.

Special Issue "5G Mission-Critical Applications"

- [Special Issue Editors](#)
- [Special Issue Information](#)
- [Published Papers](#)

A special issue of *Sensors* (ISSN 1424-8220). This special issue belongs to the section "Communications".

Deadline for manuscript submissions: closed (15 December 2020).

Figure 72 Sensors — Open Access Journal - Special issue

- **Sensors — Open Access Journal - Special issue**

The 5GENESIS teams of SRL, KAU, NCSR, UMA and INTEL lead a special issue on the journal *Sensors* entitled: “Experimentation in 5G and Beyond Networks: State of the Art and the Way Forward”. This Special Issue aimed to collect original contributions on experimental aspects of 5G and beyond networks and systems. Manuscript’s deadline was on 30 April 2021. More information on this special issue call for papers is available here: https://www.mdpi.com/journal/sensors/special_issues/5G_beyond_networks.

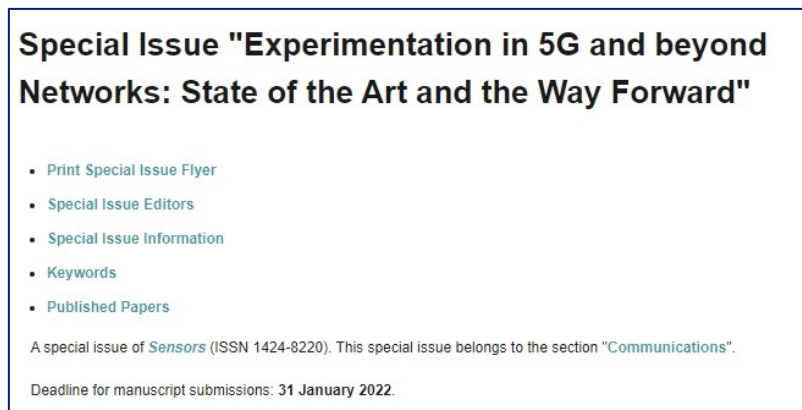


Figure 73 : “Experimentation in 5G and Beyond Networks: State of the Art and the Way Forward”

- **5G-FORUM Sponsorship**

The 5GENESIS project was among the sponsors of the 5G FORUM 2021 that took place between 4-6 May 2021. Read more about the 5G-FORUM event at: <https://www.5gforum.es/>.



Figure 74 5G Forum-2021

- **Industry Forum Proposal + Invited talk**

A team of experts coming from different domains (academia, research institutes, Small-and-Medium-Enterprise, and industry) led by Dr. Valerio Frasca (Intel) won the Industry Forum Proposal “Hurdles, Challenges, and Opportunities of IoT Moving Towards 6G”, which entailed

invited speeches, demos and a final panel with the aim of discussing the hurdles, the challenges and the opportunities of IoT moving towards the 6G system in the context of the IEEE 7th World Forum on Internet of Things (WF-IoT).

During that event Dr. Valerio Frascolla (Intel) gave the invited talk “‘issues and solutions for a live, mixed technology IoT deployment’ (examples from the 5GENESIS project – Surrey platform)”. You may find more information here: <https://wfiot2021.iot.ieee.org/>.



Figure 75 Industry Forum Proposal

- MWC2021

5GENESIS provided leaflet and demo video, available in the MWC2021 website on the page featuring 5G-PPP. You may find them here: <https://www.mwcbarcelona.com/exhibitors/5g-public-private-partnership-5g-ppp>.

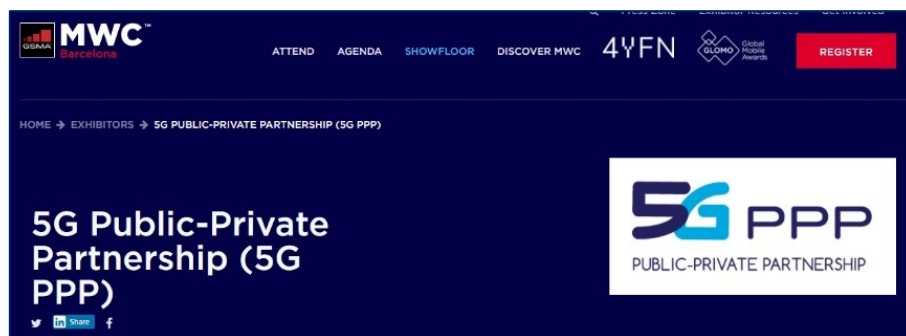


Figure 76 MWC2021

- Critical Communications World (CCW2021) – Booth

Nemergent, 5GENESIS partner, participated through a booth in the Critical Communications World (CCW2021) conference and exhibition that took place in Madrid, Spain on 3-5 November 2021, as part of 5GENESIS 5G Malaga platform activities. More information about the event here: <https://www.critical-communications-world.com/>.



Figure 77 Critical Communications World (CCW2021)

- Critical Communications World (CCW2021) – Exhibition

Nemergent, 5GENESIS partner and member of 5GENESIS Malaga platform, demonstrated the integration of 3GPP MCPTT calling over a 5G network, and enabling interconnection with DMR talkgroups. This demo took place at the Nemergent booth in the Critical Communications World (CCW2021) conference and exhibition, Madrid, Spain, 3-5 November 2021, as part of 5GENESIS 5G Malaga platform activities. Find the video at the 5GENESIS YouTube channel here: <https://www.youtube.com/watch?v=Qp0aZksG5HU>.



Figure 78 Critical Communications World (CCW2021) – Exhibition

- **Poster presentation at MSWIM'21**

5GENESIS participated at MSWIM'21 through a poster session-presentation at Modeling, Analysis and Simulation of Wireless and Mobile Systems conference. More information about the event here: <https://dl.acm.org/conference/mswim>.

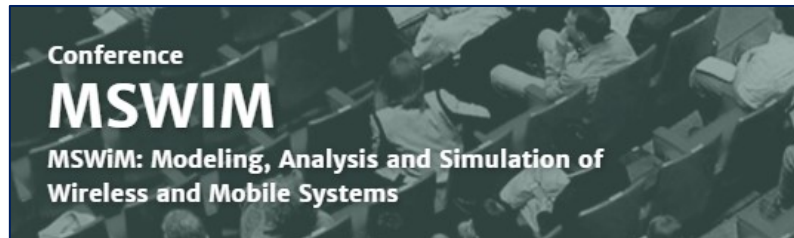


Figure 79 MSWIM'21

- **5G Techritory Online Vote**

5GENESIS was voted as the most favourable 5G-PPP ICT-17 project during the 5G-PPP Infrastructure Projects–Key findings session at 5G Techritory-Europe's Leading 5G Ecosystem Forum, November 22, 2021 at 5G Techritory.



Figure 80 5G Techritory online voting

4.3. Demonstrations in industrial exhibitions and scientific events - Period 3

During period 3, 5GENESIS partners presented the 5GENESIS facility in various demo events. Here we list those events and provide information of the demonstrations that took place (Table 14).

Demonstration Events			
	Title	Event	Date/Location
1	Cross-platform Mission Critical Services Showcasing	5GENESIS Project-based dedicated event	Athens, Egaleo Stadium, Málaga city center and Ada Byron Research Building 23-24/11/2021

2	360 Camera Big Event coverage	5GENESIS Project-based dedicated event	Athens, Egaleo Stadium 23-24/11/2021
3	5G playground – 5G portable node	5GENESIS Project-based dedicated event	Berlin, IHP, Frankfurt Oder 30/11/2021
4	5G rural applications field trials	5GENESIS Project-based dedicated event	Athens, Greece 19/5/2021
5	Limassol platform public demo (Satellite edge computing for 5G rural applications)	IEEE MeditCom	Online, 10/9/2021
6	Maritime communications trials	5GENESIS Project-based dedicated event	Piraeus, Greece, 3/11/2021
7	Police Wireless Video and Mission Critical Services first responders	5GENESIS Project-based dedicated event	Málaga, Ada Byron Research Building, June 2021
8	Police Wireless Video use case showcase during Málaga's The Magna Procession	5GENESIS Project-based dedicated event	Málaga city center 30/10/2021
9	3GPP MCPTT calling over a 5G network	Critical Communications World (CCW2021) conference	Spain, 3-5/11/2021
10	Mission Critical Services use cases showcase	5GENESIS Project-based dedicated event	Málaga city center and Ada Byron Research Building 21-22/11/2021
11	Police Wireless Video use case at Málaga's Thyssen Museum	5GENESIS Project-based dedicated event	Málaga city center Thyssen museum, 9/12/2021
12	An open source 5G experimentation testbed	IEEE MeditCom 2021	Online, 10/9/2021
13	An Experimentation Platform for Automated Assessment of Multimedia Services over Mobile Networks	INFOCOM demo session	Online, 10-13/5/2021
14	Video surveillance aided by Drone	5GENESIS-5G!Drones Project-based dedicated event	Athens, OTE Academy Week 28/6/2021 - 2/7/2021
15	Multi-RAT support for sensor measurements	5GENESIS Project-based dedicated event	Surrey, UK, University Building (5G Innovation Centre) November and December 2021

Table 14. Participation in various demonstration and industrial exhibition events

More information about the activities listed in Table 14 can be find below.

1. Cross-platform Mission Critical Services Showcasing

A cross-platform experiment was showcased involving MCS services at both 5GENESIS Málaga and Athens platforms. The two platforms have been interconnected in order to deploy MCS services in each platform that will allow local teams of first responders to

collaborate among each team members as well as among the different teams. The scenario demonstrated 5GENESIS facility capability to coordinate a cross-platform attended experiment with the participation of personnel in real-life environment. A related [video](#) is online available (the second half of the video targets this specific use case)



Figure 81. 5GENESIS Cross-platform Mission Critical Services Showcasing

2. Big Event multimedia coverage showcasing event

In the event the Athens platform demonstrated the use of Open5GENESIS suite for the deployment of 5G and vertical application components required for the scenario realization in order to offer 360° video coverage (a related video camera was used) to local consumers as well as remote. The event took place on 23-24/11/2021, inside the Egaleo Football Stadium, in the city of Egaleo (Athens suburban area), Greece.



Figure 82. 5GENESIS Big Event multimedia coverage showcasing event

3. 5G playground – 5G portable node

To extend a network capacity to a specific location, one of the most attractive use cases is to make the network portable or mobile, enabling private local communication as well as efficient backhauling to a central location or to edge nodes. This was the target of a field trial in Frankfurt/Oder IHP, on November 30, 2021. The event was an attempt from 5GENESIS project (Berlin Platform) to prove that a portable network can be installed and configured at the specific use case location in a matter of minutes and remain in use for a specific duration of time of the use case (such as for fairs or for construction sites). Some related posts in social media ([LinkedIn1](#), [LinkedIn2](#)) and a [video](#) on YouTube are available as well.



Figure 83. 5G playground – 5G portable node

4. 5G rural applications field trials.

The objective was to evaluate in the field 5G edge computing for IoT/rural applications. A drone platform was used for capturing crop images, transmit it over 5G to the edge node where AI was employed for automatic crop detection.

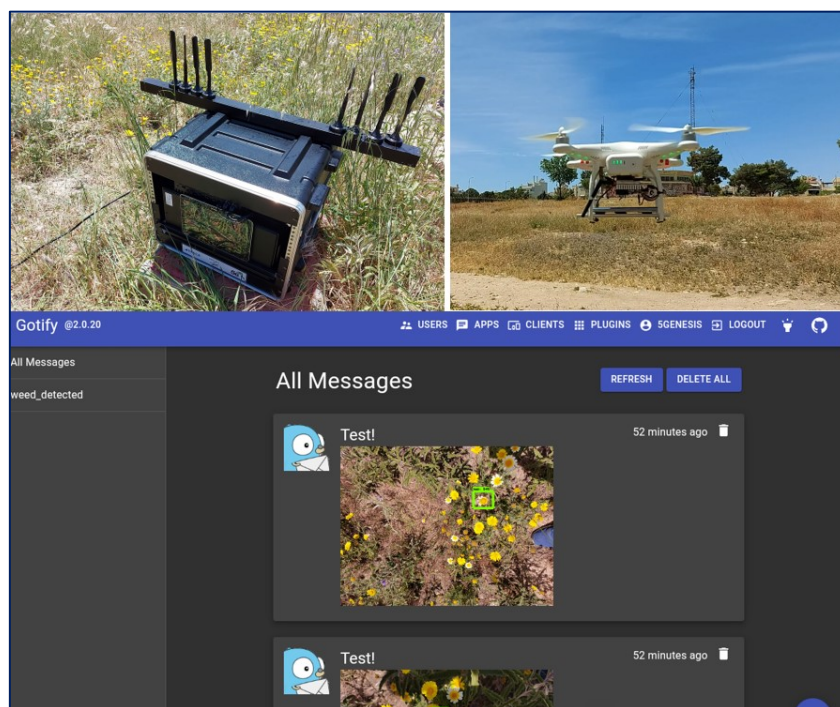


Figure 84. 5GENESIS rural applications field trials

5. 5GENESIS Limassol platform public demo

This was the main public demo event, where most features of the Limassol platform were demonstrated, including 5G SA access, satellite backhauling and edge computing with local break-out. The demo was presented in the context of [IEEE MEDITCOM 2021](#) which took place in Athens on 7-10 September 2021.

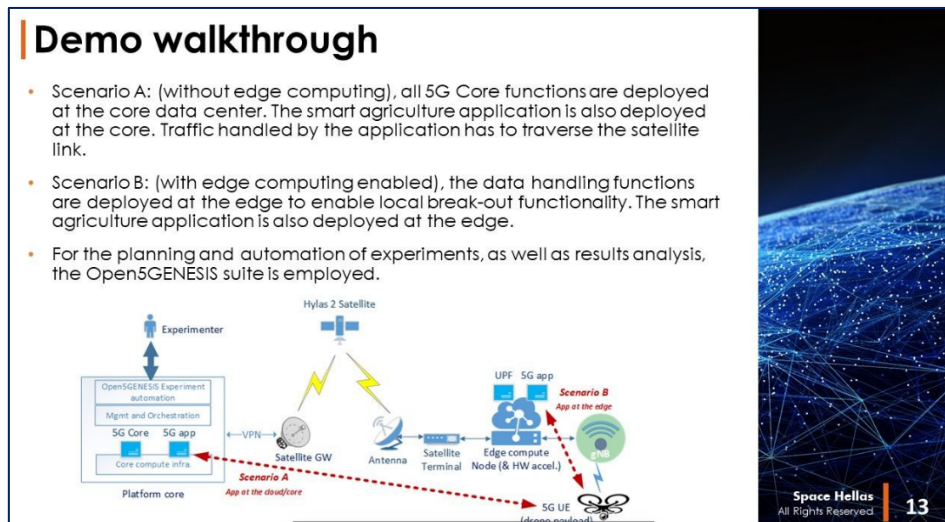


Figure 85. 5GENESIS Limassol platform public demo

6. Maritime communications trial

The maritime communications demo was carried out on board of the MARAN GAS KALYMNOS. Here we tested 5G SA operation on-board, satellite backhauling, indoor propagation and evaluated the maritime application specifically developed for this purpose (Real-time rust detection using AI and augmented reality). Some related posts in social media ([LinkedIn](#), [Twitter](#)) are available as well.



Figure 86. 5GENESIS Maritime communications trial

7. Police Wireless Video and Mission Critical Services – first responders

This event served as a first demonstration to Málaga Police of the use cases integrated in the 5Genesis Málaga Platform. In it the platform validated the progress in both the video and the MCS use cases and its correct performance outside of the laboratory environment. The [related video](#) is also available.



Figure 87. 5GENESIS Police Wireless Video and Mission Critical Services – first responders

8. Police Wireless Video use case showcase during Málaga's "The Magna Procession"

UMA, Telefónica and Málaga Police deployed a remote mobile control center for the video surveillance of a large-scale event taking place in Málaga in October 2021, The Magna Procession. The Police Wireless Video use case of the platform was completely demonstrated in a big real-life event, including the reception in 5G UEs of video from fix police cameras in the city and also the transmission of video from 5G UEs in real-time to the control center, greatly enhancing the surveillance capabilities of the police thanks to 5G and the 5Genesis Málaga Platform. More info can be found in the [related video](#).



Figure 88. 5GENESIS Police Wireless Video use case showcase during Málaga's "The Magna Procession"

9. 3GPP MCPTT calling over a 5G network

Nemergent R&D team, 5GENESIS partner and member of 5GENESIS Malaga platform use cases, demonstrates the integration of 3GPP MCPTT calling over a 5G network, and enabling interconnection with DMR talkgroups. This demo took place at the Nemergent booth in the Critical Communications World (CCW2021) conference and exhibition, Madrid, Spain, 3-5 November 2021. More info can be found on the [related video](#).



Figure 89. 5GENESIS 3GPP MCPTT calling over a 5G network

10. Mission Critical Services use cases showcase

The two Mission Critical Services use cases envisioned for the 5GENESIS Málaga platform are the target of this showcase, which replicated a real-life scenario in which first responders need to communicate using the MCS services integrated in the platform. The most updated versions of the MCS services (from Airbus) were used and their functionalities are demonstrated, such as MCPTT private and group calls, MCVideo calls, and MCX-DMR interoperability. The related [video](#) is online (the first half of the video targets this specific use case)



Figure 90. 5GENESIS Mission Critical Services use cases showcase

11. Police Wireless Video use case at Málaga's Thyssen Museum

The event focuses on the Police Wireless Video use case. A similar (but reduced) setup as the one deployed for “The Magna Procession” event was demonstrated in the Thyssen Museum showcasing the wireless video capabilities of 5G and the Málaga Platform.



Figure 91. 5GENESIS Police Wireless Video use case at Málaga's Thyssen Museum

12. An open source 5G experimentation testbed

5GENESIS portable demonstrator was presented by Panos Matzakos (EURECOM) under the title “An open source 5G experimentation testbed” in the context of [IEEE MeditCom 2021](#) which took place in Athens on 7-10 September 2021.

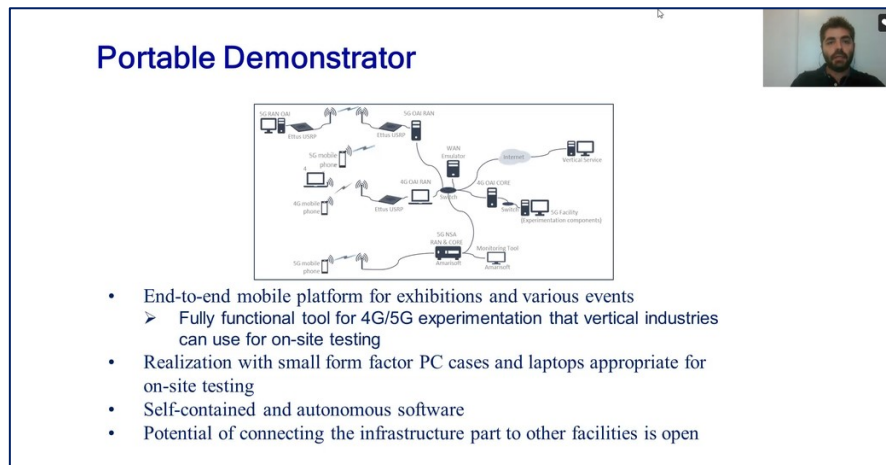


Figure 92. An open source 5G experimentation testbed

13. An Experimentation Platform for Automated Assessment of Multimedia Services over Mobile Networks

This demonstration refers to the 5GENESIS portable platform with FOGUS test cases integrated, related to the assessment of multimedia services using the open 5GENESIS suite. It was presented in the IEEE International Conference on Computer Communications 10-13 May 2021 (Virtual Conference).

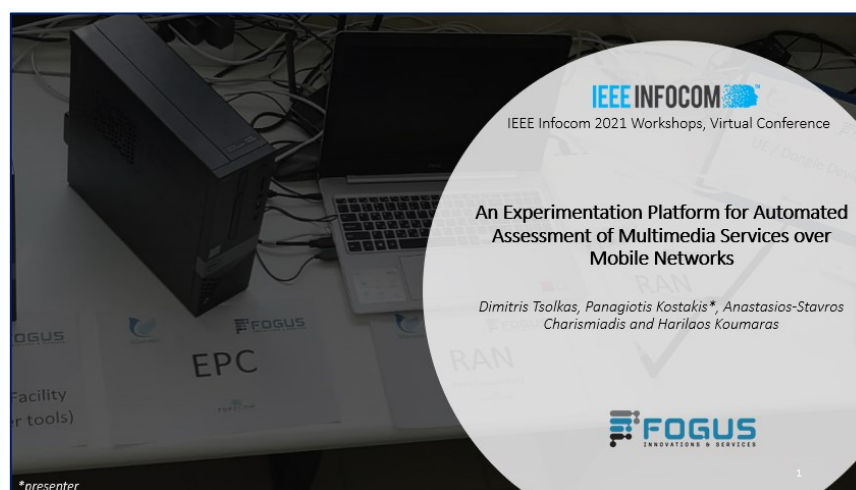


Figure 93. An Experimentation Platform for Automated Assessment of Multimedia Services over Mobile Networks

14. Video surveillance aided by Drone

This is an event where 5GENESIS and 5G!Drones (ICT-19) projects collaborated to showcase the use of 5G for control and video transmission over a drone. The event took place on 28/6/2021 – 2/7/2021, in the OTE Academy premises, Athens, Greece. More info can be found on the related [video](#).

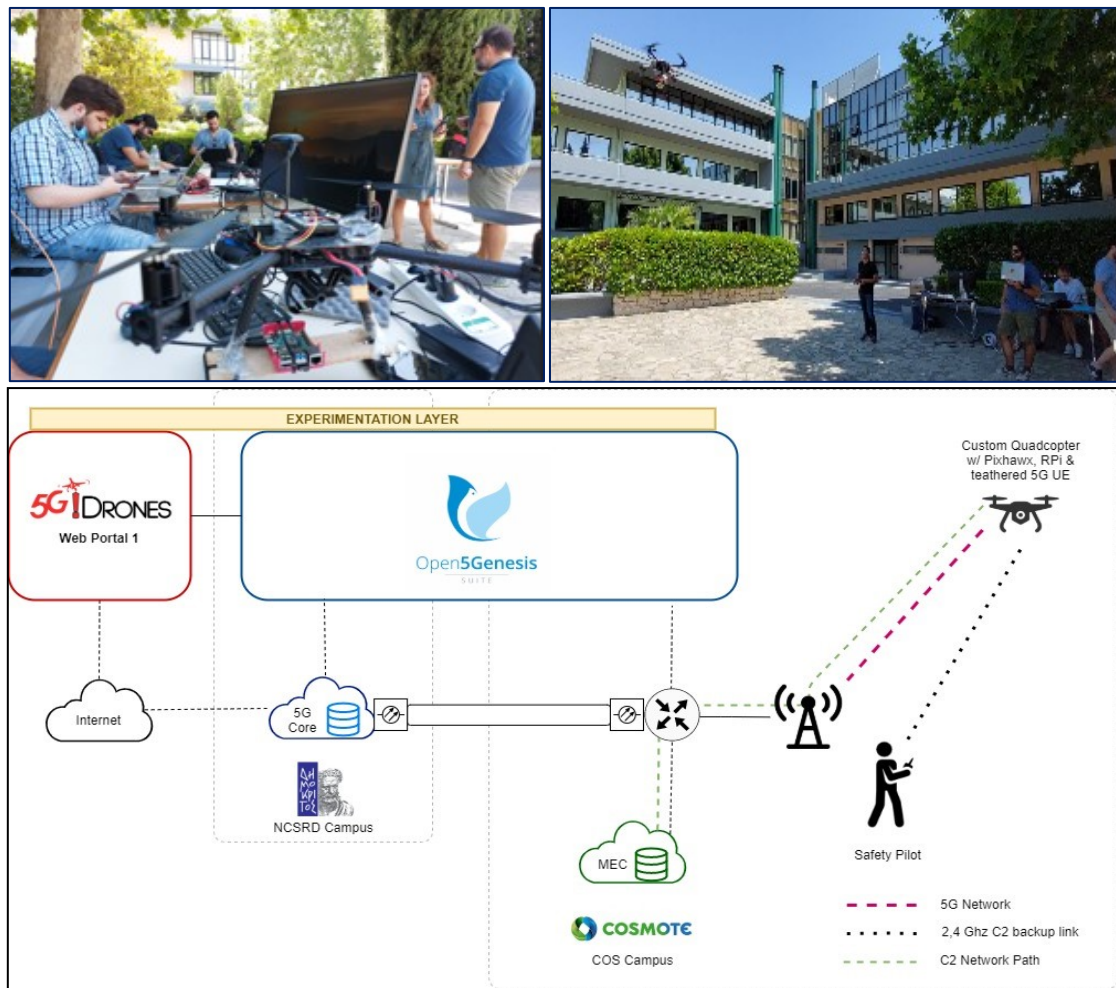


Figure 94. 5GENESIS Video surveillance aided by Drone

15. Multi-RAT support for sensor measurements

In November and early December 2021, the final demonstration of the Surrey Platform IoT use case took place in the building of the University of Surrey 5G Innovation Centre (5GIC), which is the host of the Surrey Platform. Within the context of this use case, 30 Pycom/Pysense boards were deployed in the 5GIC building.

The experiment consisted of reading sensor values and sending them –in JSON format– relying on various protocols, namely HTTP, MQTT and CoAP, through WiFi and 5G, with the use of a CPE device, to an IoT-vGW, developed by INFOLYSIS partner.

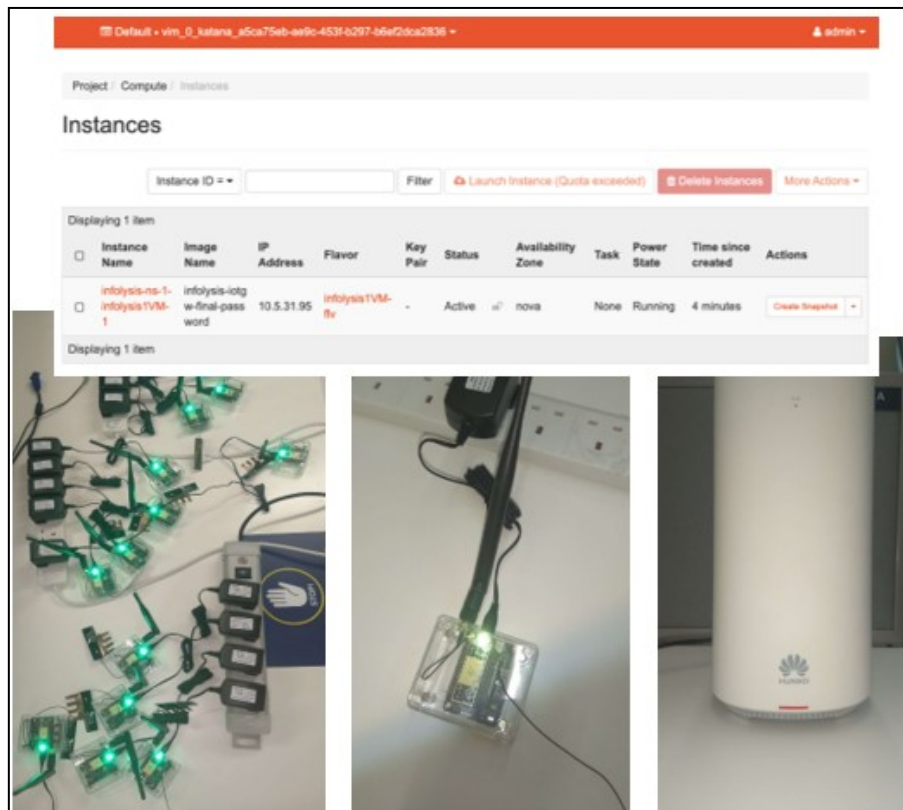


Figure 95. 5GENESIS Multi-RAT support for sensor measurements

For the purpose of this use case, two slices were spun-off by the 5GENESIS Slice Manager and at the same time the 5GIC NOC system created these two slices at the 5GC using two separate APNs to support the end-to-end service.

4.4. Evaluation, Statistics and Impact of Period 3 Activities

This section provides an evaluation of the third period of the project on how and whether the set of goals for this dedicated period have been met successfully.

4.4.1. Quantitative Results and Evaluation of Activities

In the previous section a summary of all the dissemination and communication activities was presented for the third and final period of the project. In specific, a thorough presentation of each of the activities was presented along with their respective tables indicating additional information per activity (such as event name, activity title, links of the publications and so on).

In Table 15 can be found all the activities' goals set for Period 3 as per the dissemination plan, as well as the third period's activities and achievements. **The third's period goals have been met notwithstanding the coronavirus outbreak, which caused various events to be limited, turned into virtually or cancelled. In total, the 5GENESIS period 3 communication and dissemination activities performed a total number of 129 activities while this period goals were set to 65 activities.**

As it can be clearly seen through Table 15 the members of the consortium have made 57 publications in total. From this number, **30 publications were in journals, conferences and workshops, 11 white papers, 19 articles and book chapters.** Furthermore, 5GENESIS had participation in **11 workshops.** The partners participated in **24 presentations** and in **10 invited talks and panels.** Finally, members of the consortium took place in **9 other activities like business days, poster sessions and booths** and made **15 demos/showcasing events** in this reporting period.

Activity	Period 3 Goals	Period 3 Achievements
Publications (in Journals/Conferences)	>11 in journals/conferences/ workshops (>22 as total publications)	30
Publications (in Workshops)		30
General Publications (Articles in Magazines, Books, Websites, Newspapers, White Papers)		(60 in total)
Workshops (organized by 5GENESIS, co-organized with other projects, participation)	>11	11
Presentations (in Conferences, Workshops, InfoDays, Events)	>11	24
Participation in Conference Panels and Invited Talks	>5	10
Others (Exhibitions, Business Days, Booths in Conferences, Poster Sessions, Awards)	>11	9
Demonstrations in industrial/exhibitions and scientific events	>5	15

Period 3 Total number of targeted activities and articles	>65	129
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Table 15. Dissemination activities and Period 3 goals

The following sections 4.4.2 and 4.4.3 present in detail information regarding the performance of the website as well as the social media channels respectively during the Period 3, July 2020-October 2020 (reporting the 16-month period, since statistics of November were not processed yet when this deliverable was under final editing early December).

At this point and before we proceed to the evaluation of the statistical dashboards of the website and social media, it is very useful to analyse some meanings concerning the digital existence of the project. So, the following table summarizes the most important metrics and their meaning.

Term^{1 2 3 4}	Meaning
Bounce rate	In web analytics, the percentage of visitors who leave after viewing a single page.
Engagement	Engagement is any form of interaction with your brand on social media. Likes, comments, and shares are all forms of engagement
Engagement rate	Engagement rate is a measure of how many people interact with your social media content. There are several ways to calculate engagement rate, but all aim to calculate what percentage of people who were exposed to a post choose to engage with it in some way.
Hits	An interaction that results in data being sent to a tracking solution (i.e. Google Analytics). One session can include multiple hits such as page views, events, or social interactions.
Impressions	How many times users viewed a tweet.
Reach	On how many users your post was projected/shown to.
Sessions	A group of interactions or hits with your website. A session may include several web page visits and interactions or it may contain just one. A new session begins if a user visited a website via one campaign, leaves and comes back via a different campaign. A new session will also start after midnight or after 30 minutes of inactivity. This means a single user might have multiple sessions in a single day or over several weeks.
Users	People visiting a website. The same person may be counted as multiple users if that person uses multiple unlinked devices to access a website.

Table 16 Digital Terms Meanings

¹ <https://blog.hootsuite.com/social-media-definitions/>

² <https://blog.hootsuite.com/social-video-metrics/>

³ <https://www.marketingterms.com/dictionary/>

⁴ <https://intigress.com/digital-marketing-glossary>

4.4.2. Website Performance Statistics and Dashboards

INF used Google Data Studio and Google Analytics to produce, analyse, and visualize monthly statistical dashboards for the 5GENESIS website. The statistical dashboards were distributed to the WP7 mailing list on a monthly basis. Furthermore, they were added to a specific folder in BSCW that every partner could browse for historical reference. Google Data Studio was used to visually show statistical data about the website's traffic, visitors (in accordance with GDPR requirements as per Google Analytics terms), and the sources from which the website was viewed.

Figure 96 presents the statistical results of the period July 2021 to October 2021. In this dashboard, any interested stakeholder can retrieve information regarding the users that visited the 5GENESIS website, the number of sessions, the average time on page, page views as well as the sources from which someone accessed the website.

The website statistical dashboard is also accessible at: <https://datastudio.google.com/reporting/fc4b03a5-7168-4d57-b84f-2db4e3c2fbd3/page/EP7X>

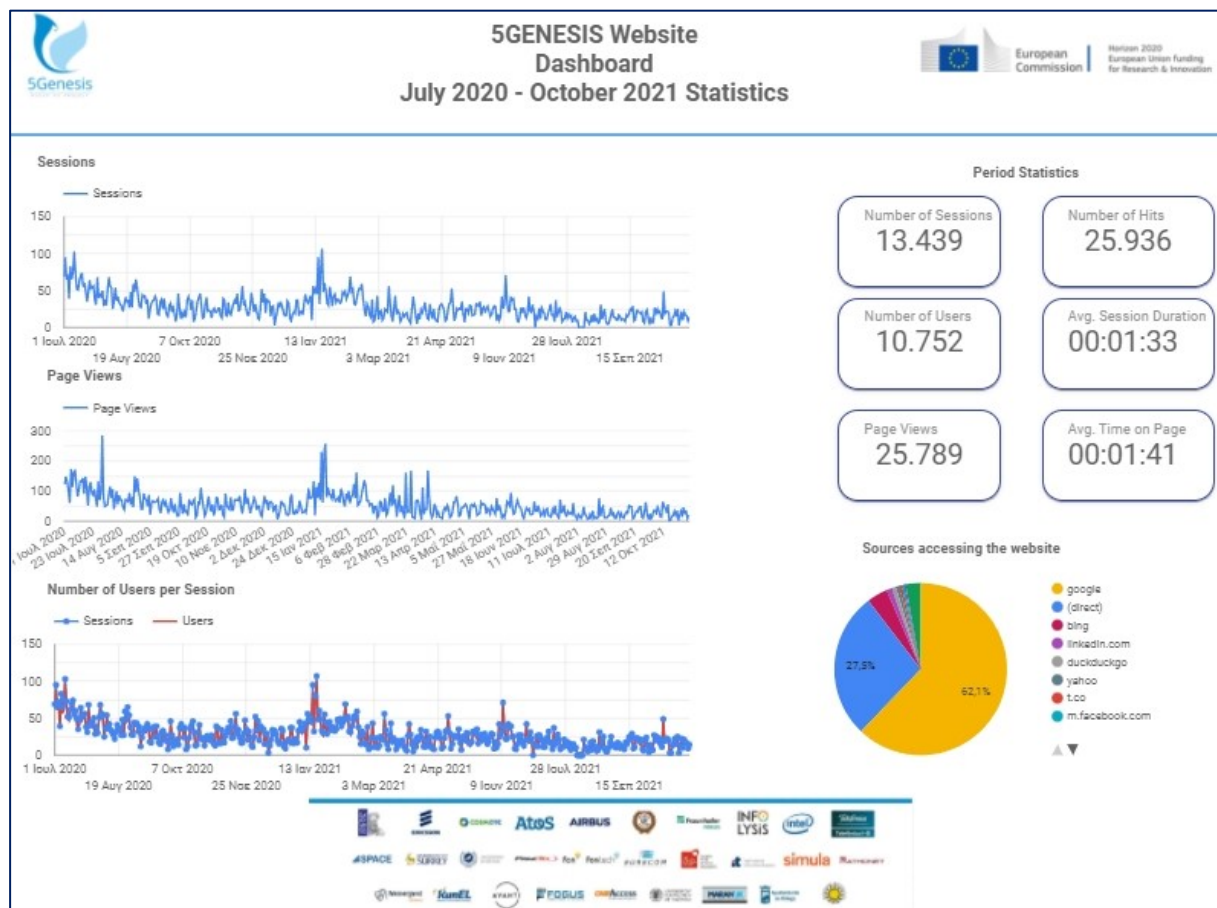


Figure 96 5GENESIS website Dashboard – Period 3

In addition, this dashboard also shows that for Period 3 the project website was visited by 10752 users. Also, the average duration of the session was 1 minute and 33 seconds. Most of our visitors (62.1%) came through the Google search machine, the following most popular choice was the direct visit to the website (27.5%).

4.4.3. Social Media Performance Statistics and Dashboards

Social media statistical dashboards were created and issued monthly with the use of Google Data Studio and the statistical data each social media channels records. Similarly to website, social media statistical dashboards were communicated with the WP7 mailing list to all partners and were added to a respective folder with statistics in BSCW. The statistical dashboards (whether social media or website dashboards) could be issued for a longer period of time such as for 6 months, annual and so on, upon request.

4.4.3.1. 5GENESIS Twitter Period 3 Dashboards

Table 17 provides information regarding the total followers and the posts per month for the July 2020 – October 2021 period. This information is visualized in Figure 97 and Figure 98, where it is clearly shown that the number of followers increased significantly through the 3rd period of the project, while the number of posts followed a steady approach in each month.

Twitter																
16-month period																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total Followers (cumulative)	825	848	868	896	922	949	986	1000	1036	1044	1073	1076	1089	1105	1110	1117
Posts per Month	11	11	14	13	10	9	9	10	10	12	10	11	9	9	11	10

Table 17 Twitter: 16-month period activity

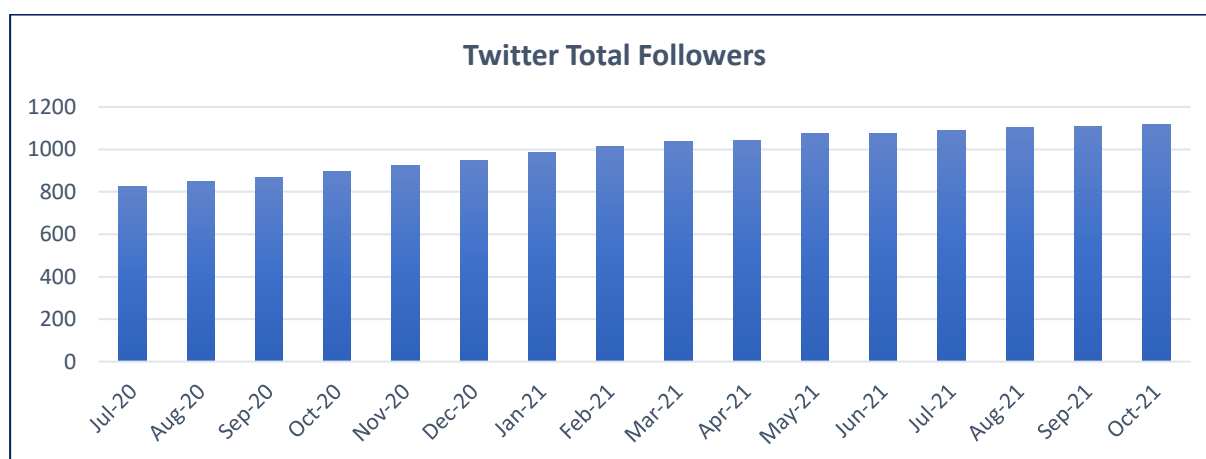


Figure 97 Twitter Total Followers per month

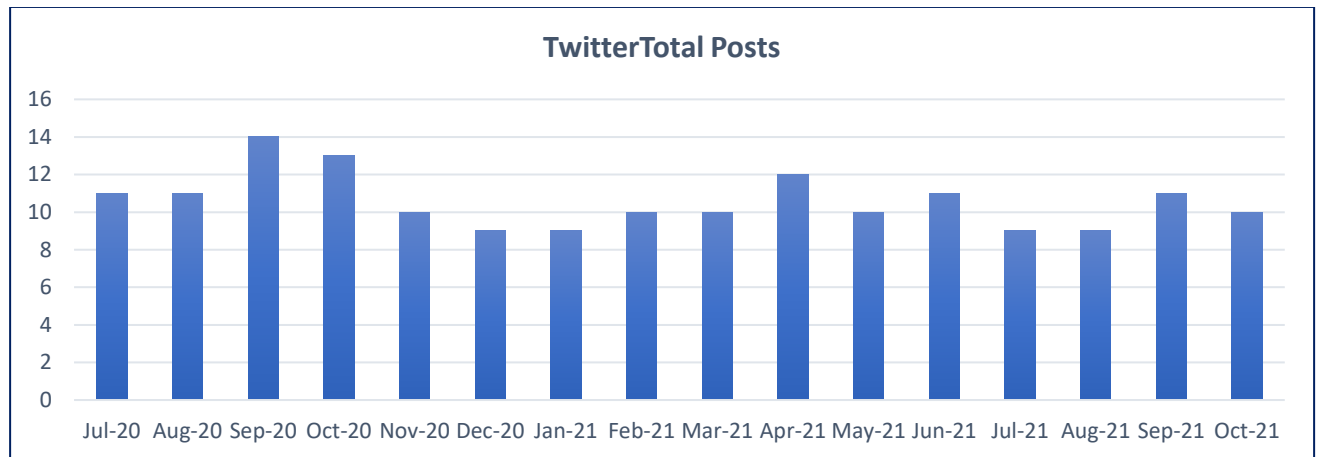


Figure 98 Twitter Total posts per month

The Twitter statistical dashboard for the third period (July 2020 – October 2021) is available below (Figure 99). The dashboard is also available in public for any interesting stakeholder through the following link: <https://datastudio.google.com/reporting/47c59233-5b8a-44ca-8788-3c62dd04c81e>

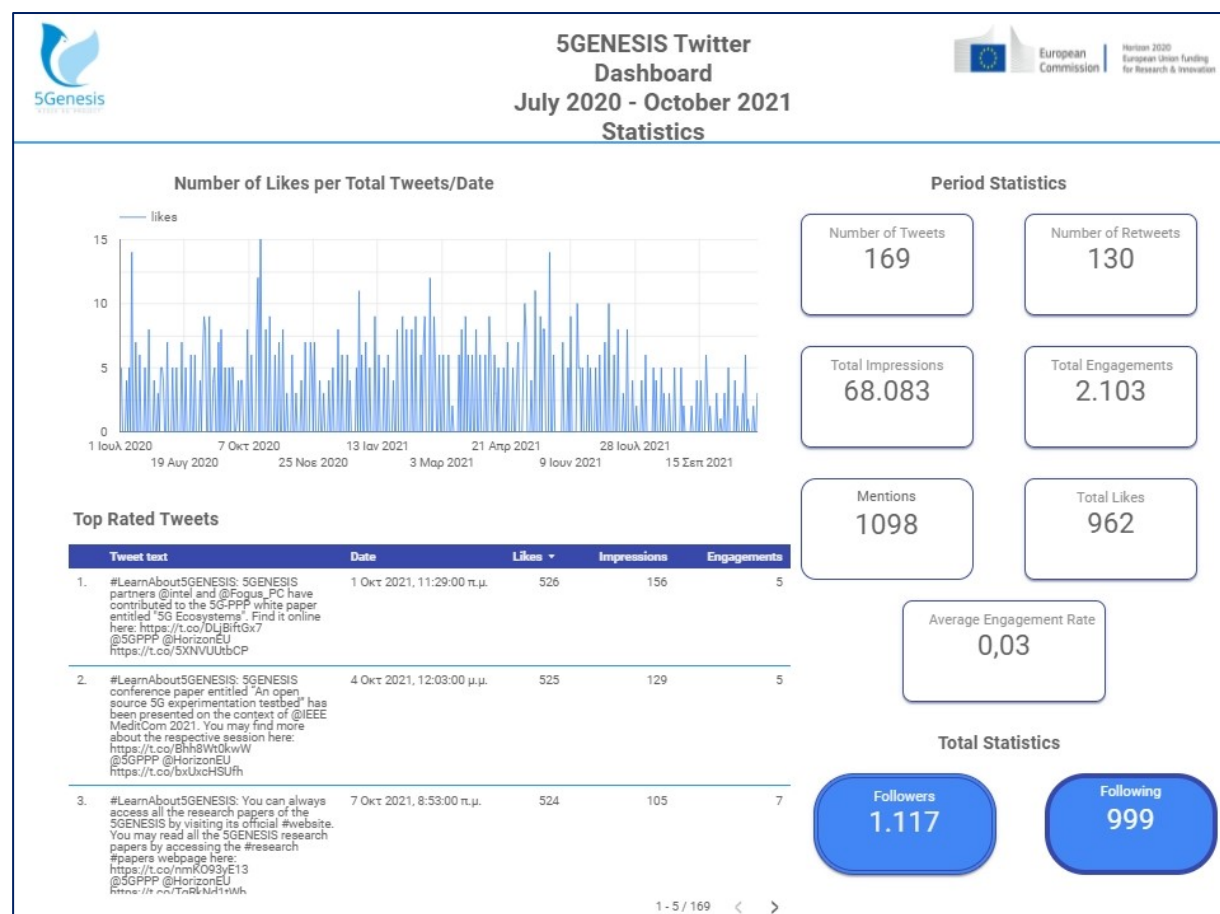


Figure 99 Twitter Dashboard

The Twitter account of the 5GENESIS project was more busy than usual in the third period. The account was used for tweeting 169 times gaining a total of 962 likes. Also, the 5GENESIS content

in this particular social media channel was retweeted 130 times and mentioned 1098 times having reached the number of 68083 number of impressions. Finally, the engagement rate of the account was 3%, noting a high rate of loyal followers.

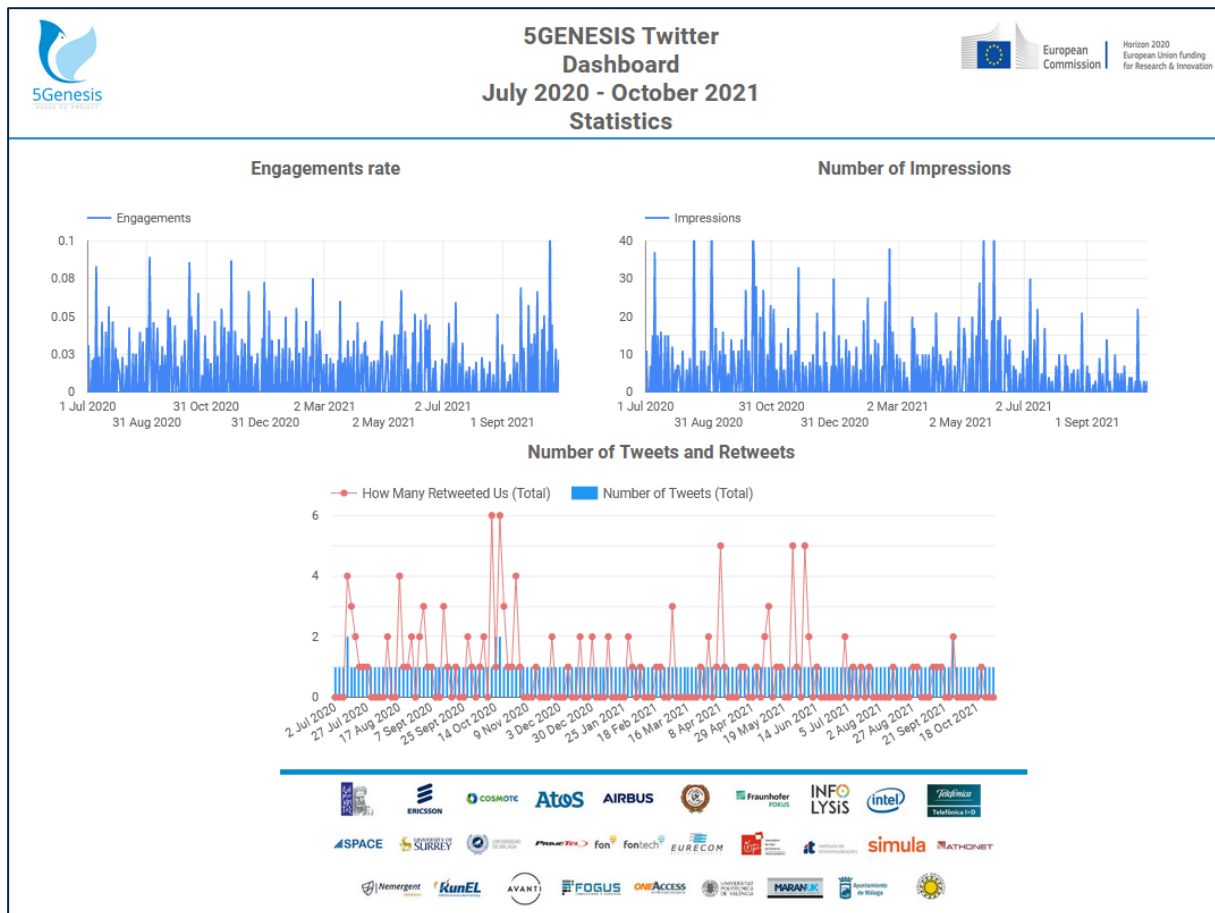


Figure 100 Twitter Dashboard - 2nd page

In Figure 100, the analysis of Twitter activity during the third period is even more detailed. Three graphs are used for visualising the engagement rate and number of impressions attained over time. Similarly, the number of tweets and retweets are plotted, denoting the constant rate of regular activity in the 5GENESIS Twitter account.

4.4.3.2. 5GENESIS LinkedIn Period 3 Dashboards

The statistical dashboards of Period 3, for LinkedIn, were developed in order to evaluate the activities performed during the period of July 2020 to October 2021. Table 18 below shows the total number of followers and the posts number per month during this period. There was a constant increase in the number of followers (Figure 101) whereas the number of posts varied due to the dissemination needs for various events per period/month (Figure 102).

LinkedIn																
16-month period																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total Followers (cumulative)	577	582	596	614	630	649	664	688	697	702	716	718	731	735	735	745
Posts per Month	12	11	13	12	10	9	9	9	9	12	12	10	9	9	10	10

Table 18 LinkedIn: 16-month period activity

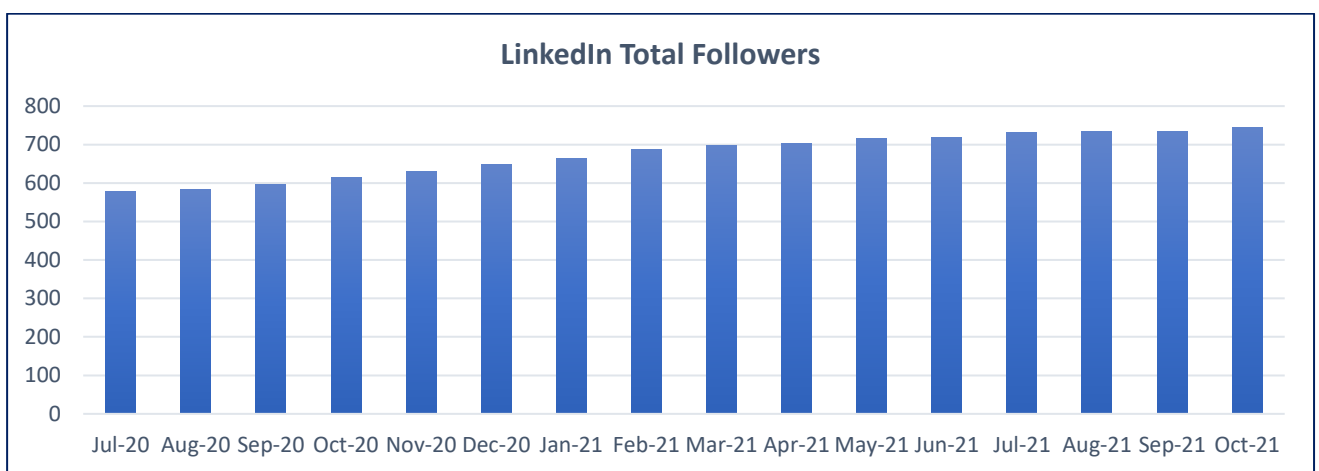


Figure 101 LinkedIn Total Followers per month

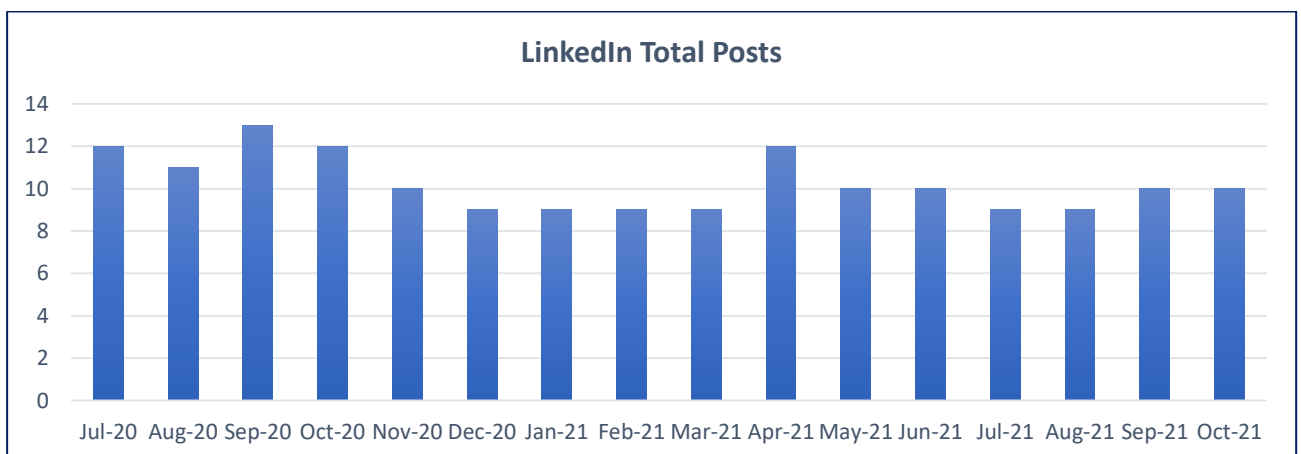


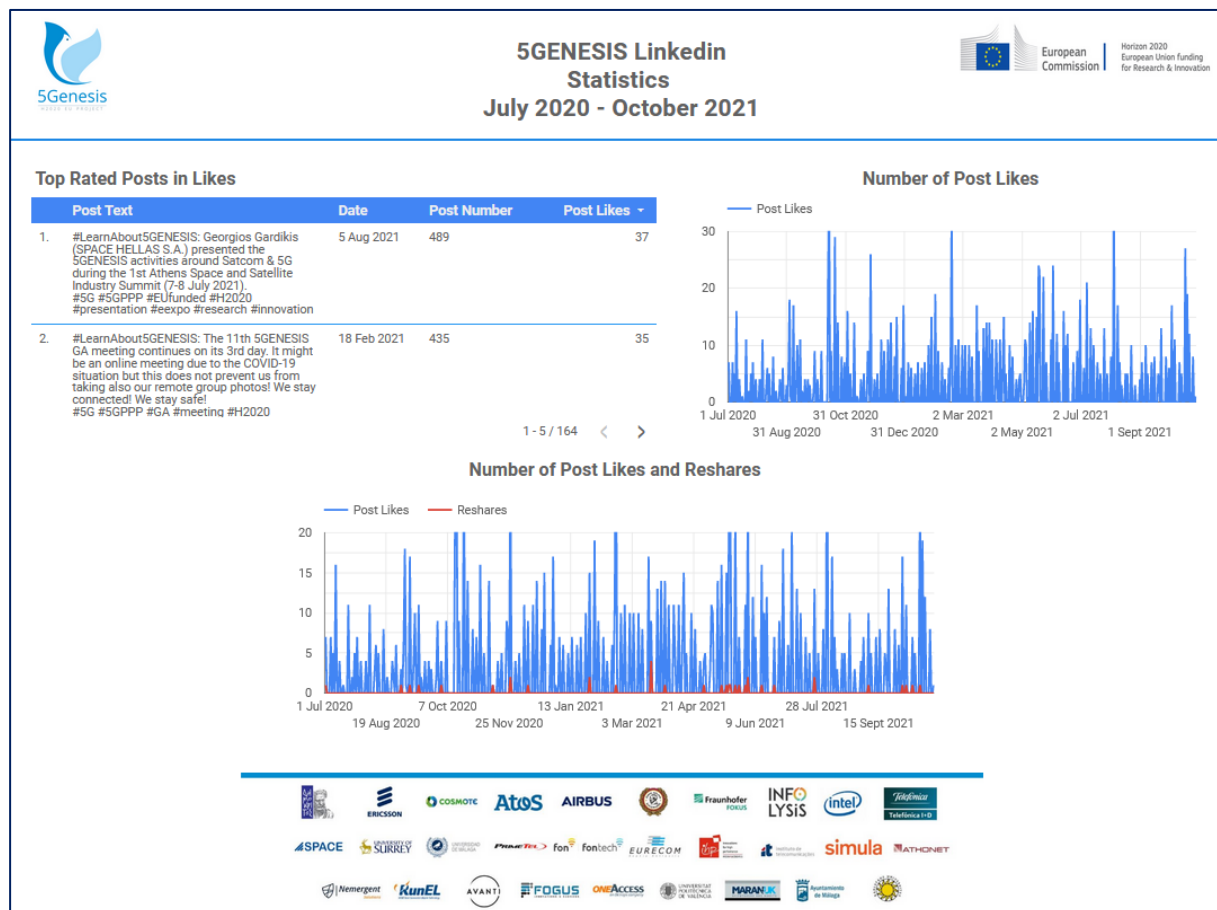
Figure 102 LinkedIn Total Posts per month

The Figure 103 below shows the third-period dashboard for LinkedIn, reporting the July 2020 – October 2021 period. The dashboard is also online accessible through the following link: <https://datastudio.google.com/reporting/140a550e-4ce1-4760-841c-aae0ee7039d3>



Figure 103 LinkedIn Dashboard

As it is clearly stated in the LinkedIn dashboard, during the third period, the LinkedIn channel had 164 posts that acquired 1548 likes. Also, the 5GENESIS content was reshared 36 times and the post views reached the number of 57457.

Figure 104 LinkedIn Dashboard – 2nd page

In addition, Figure 104 further analyses most popular posts in likes, while two graphs visualise the number of post likes and reshares over the period July 2020 to October 2021.

4.4.3.3. 5GENESIS Facebook Period 3 Dashboards

Facebook Statistical dashboards for Period 3 cover the period of July 2020 to October 2021. The graphs below show the followers and post activity monthly and throughout the third period of the project's duration. Again, the figures are used for the visualization of the results and in order to show the trend in the two fields of interest.

Facebook																
16-month period																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total Followers (cumulative)	201	202	203	210	216	221	223	228	230	231	233	233	234	235	235	237
Posts per Month	11	10	13	11	10	10	8	9	9	12	9	10	9	9	9	10

Table 19 Facebook 16-month period information.

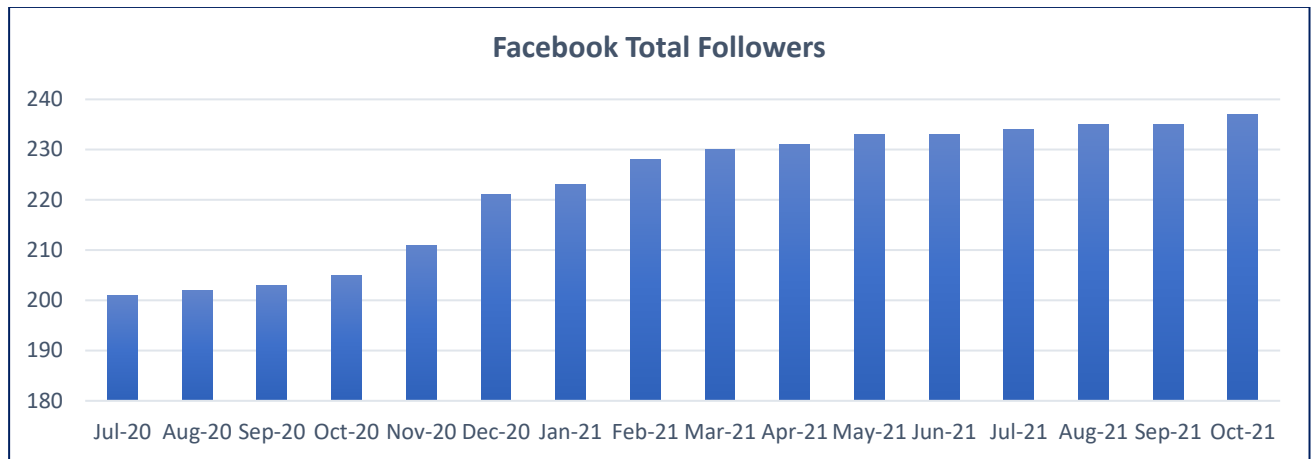


Figure 105 Facebook Total Followers per month

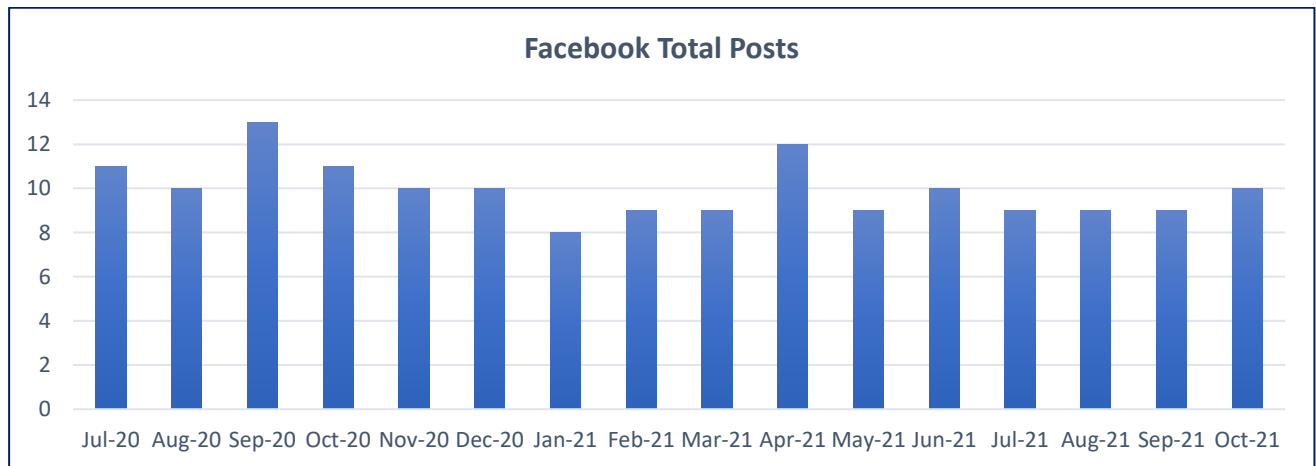


Figure 106 Facebook Total Posts per month

Figure 107 shows the Facebook dashboard for the period of July 2020 to October 2021. The Facebook dashboard is also accessible online here: <https://datastudio.google.com/reporting/7e5a2b4d-d659-4a5a-b679-4812b342f82f>

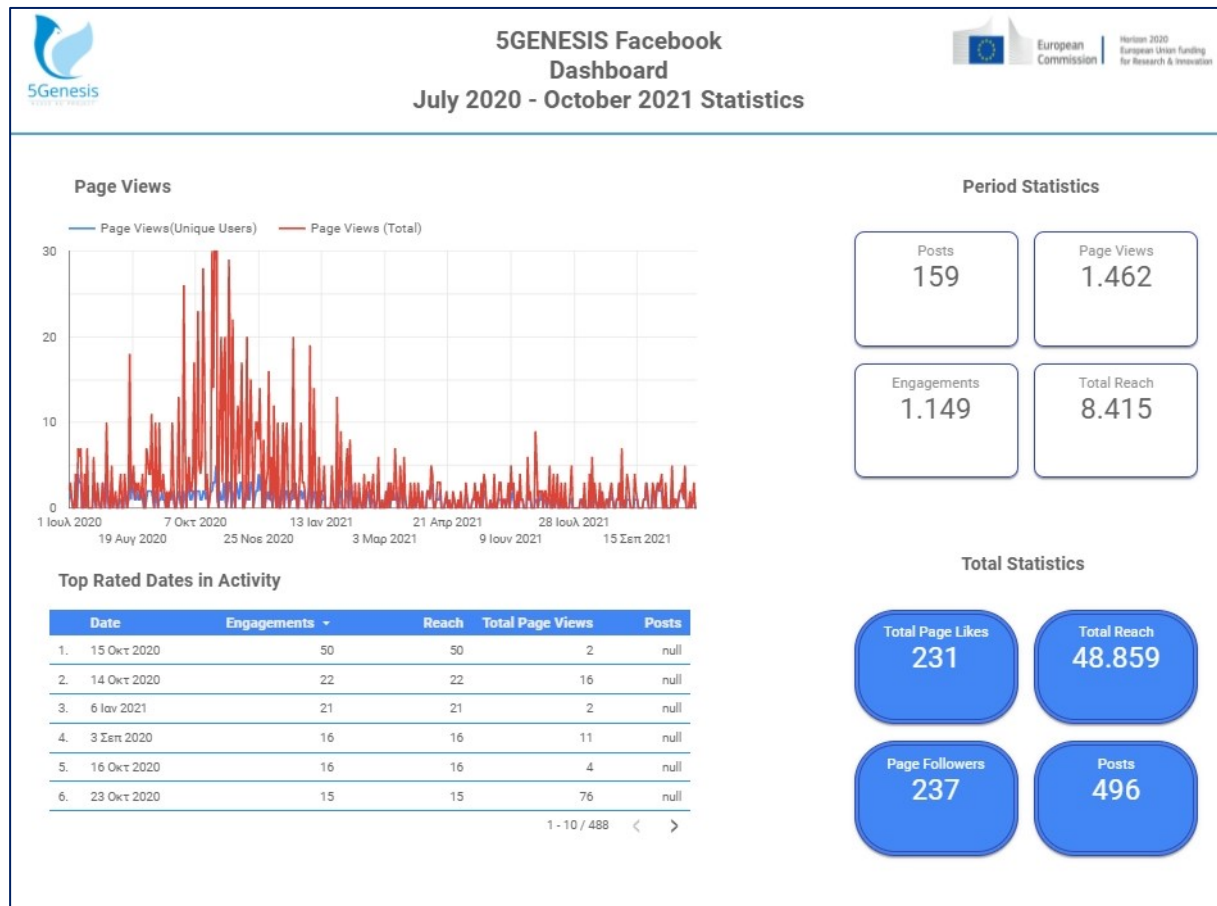
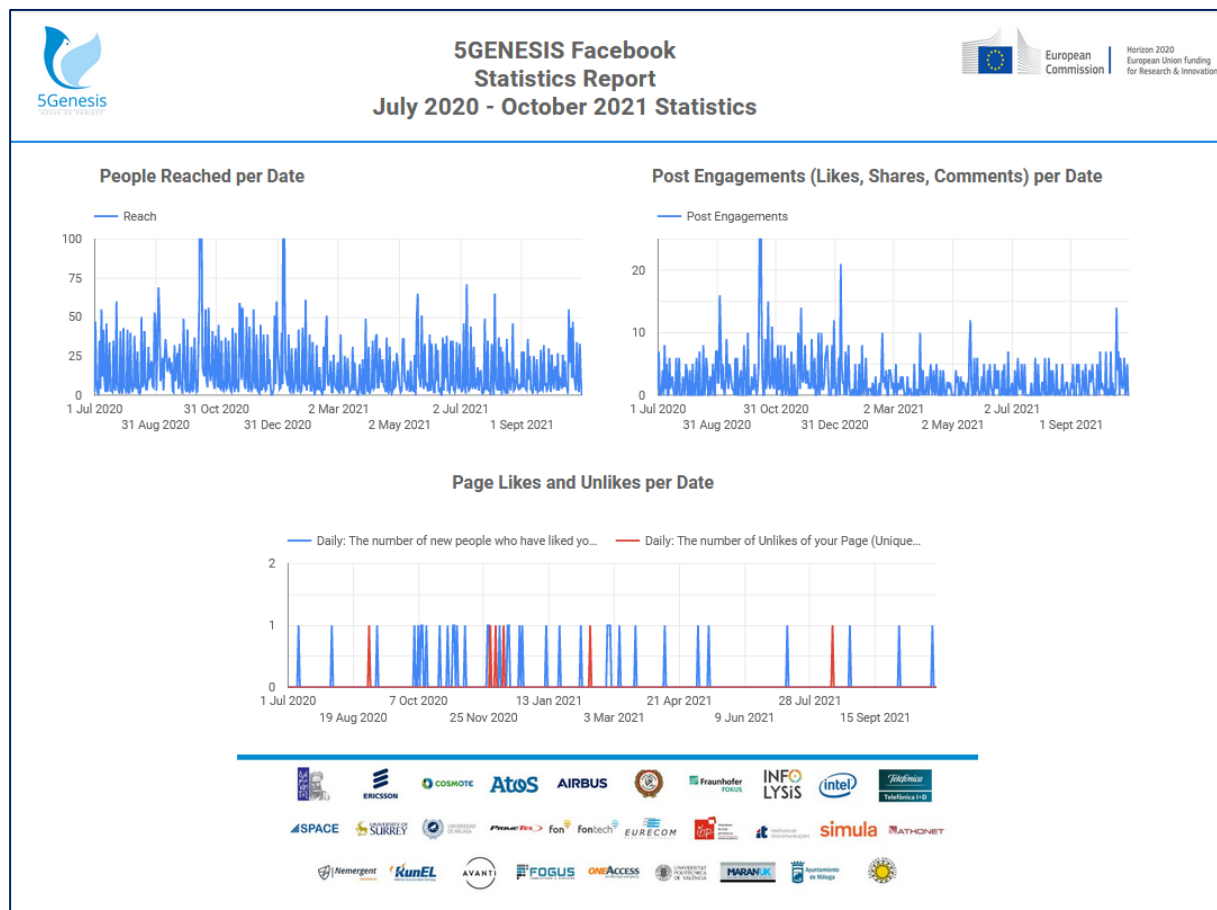


Figure 107 Facebook Dashboard

This dashboard shows, among several other information and statistics, that during the third of the period of the project, 159 posts were made. Additionally, the page views were up to 1442 and the total reach 8415.

Figure 108 Facebook Dashboard – 2nd page

For more detailed analysis of the activity, the second page of the dashboard (Figure 108) visualises in three graphs the daily activities recorded in 5GENESIS Facebook as number of people reaching the 5GENESIS Facebook page and their engagements (likes, shares, comments) with the 5GENESIS posts. In addition, the number of page likes and unlikes over the third project period are visualised through a graph.

4.4.3.4. 5GENESIS Instagram Period 3 Dashboards

The Instagram statistical dashboard covers the period from July 2020 to October 2021 and is shown in Figure 111. This channel differs from the rest of the channels by focusing basically on visual content. Table 20 shows the total number of followers and posts per month covering the forementioned period, while Figure 109 and Figure 110 the accumulation of followers and posts made per month.

Instagram																
16-month period																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total Followers (cumulative)	130	134	138	143	148	153	160	176	182	188	192	195	199	201	203	203
Posts per Month	11	9	13	11	10	9	8	9	9	12	9	10	9	9	9	10

Table 20 Instagram 16-month period information

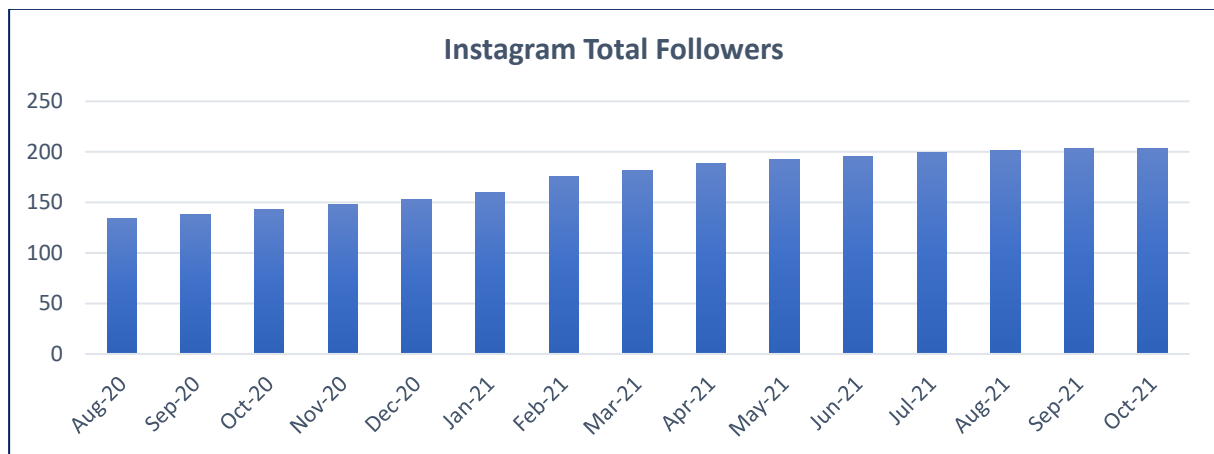


Figure 109 Instagram Total Followers per month

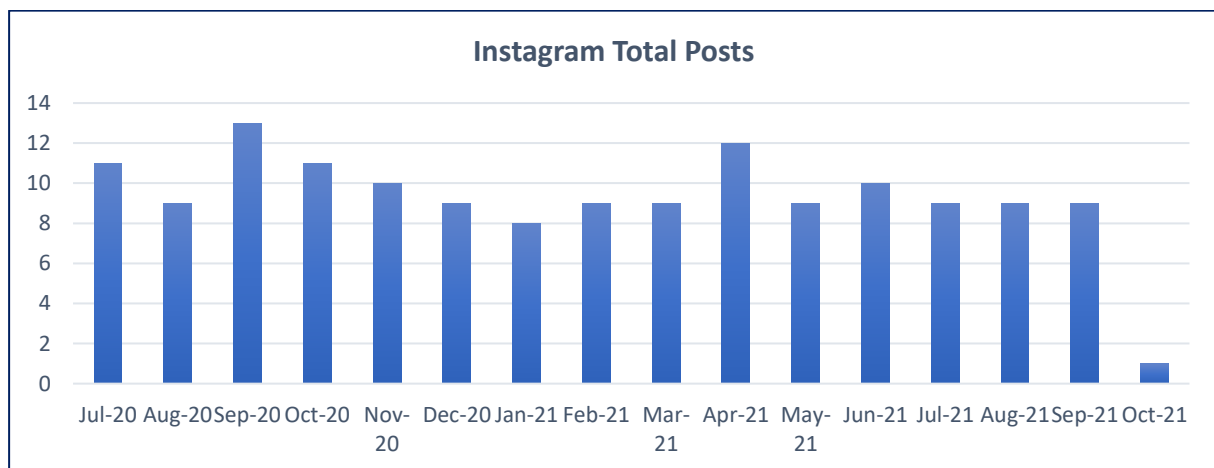


Figure 110 Instagram Total Posts per month

Figure 111 depicts the Instagram activity for the period from July 2020 to October 2021. The Instagram dashboard is online accessible here: <https://datastudio.google.com/reporting/b6e95e35-203b-44b8-bddd-e14c5a85fa99>

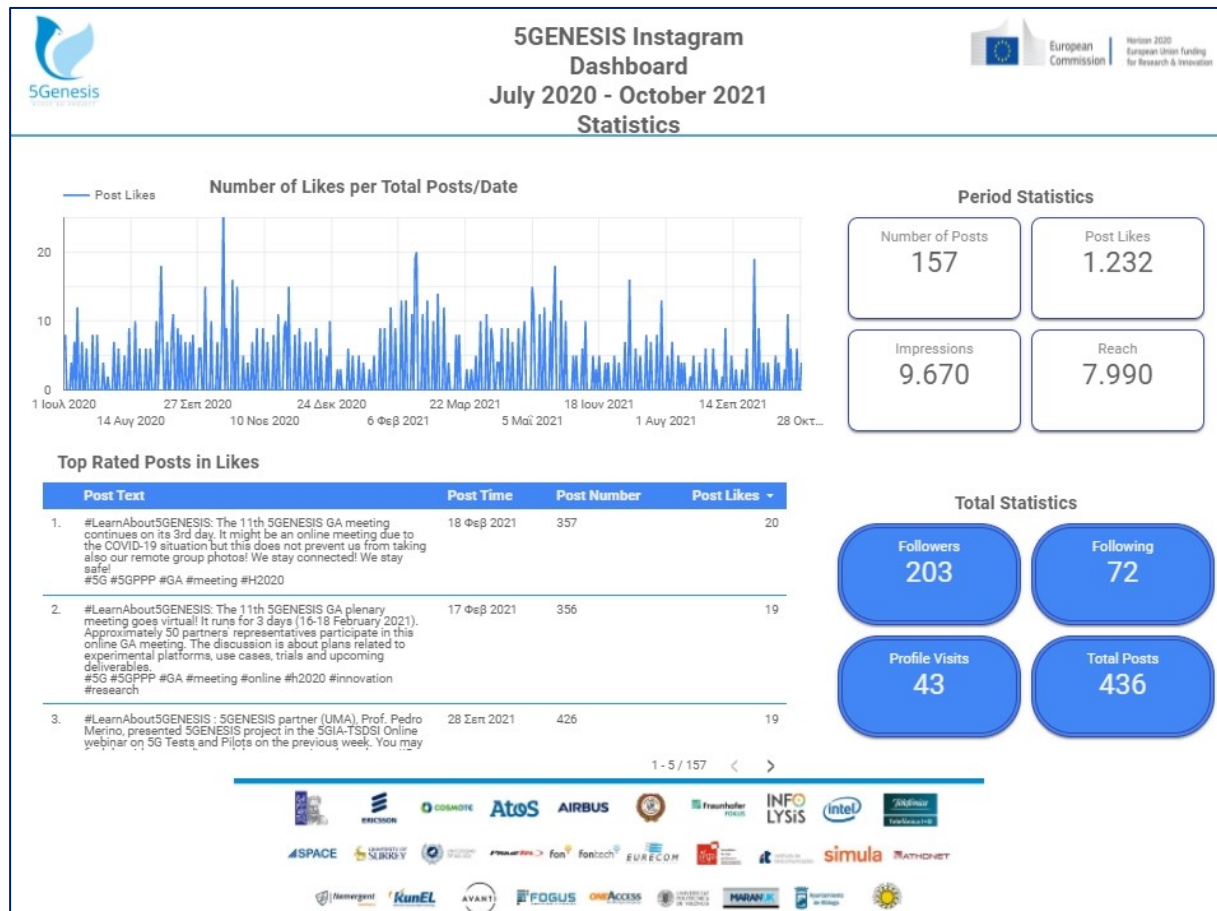


Figure 111 Instagram Dashboard

In total, the 5GENESIS Instagram account was used for posting activities 157 times through the reported period, reached a number of 9679 impressions and a total reach of 7990, it also acquired 1232 likes.

4.4.3.5. 5GENESIS YouTube Period 3 Dashboards

5GENESIS YouTube channel exists since the beginning of the project for broadcasting 5GENESIS recorded videos. This channel has been used for uploading videos related to demo activities, trials, presentation or any other 5GENESIS activities which was recorded or visualized after. Any interested viewer may access and subscribe to the 5GENESIS official YouTube channel here: <https://www.youtube.com/channel/UCrT3GgwTi3nGiHLWmKUkxug>.

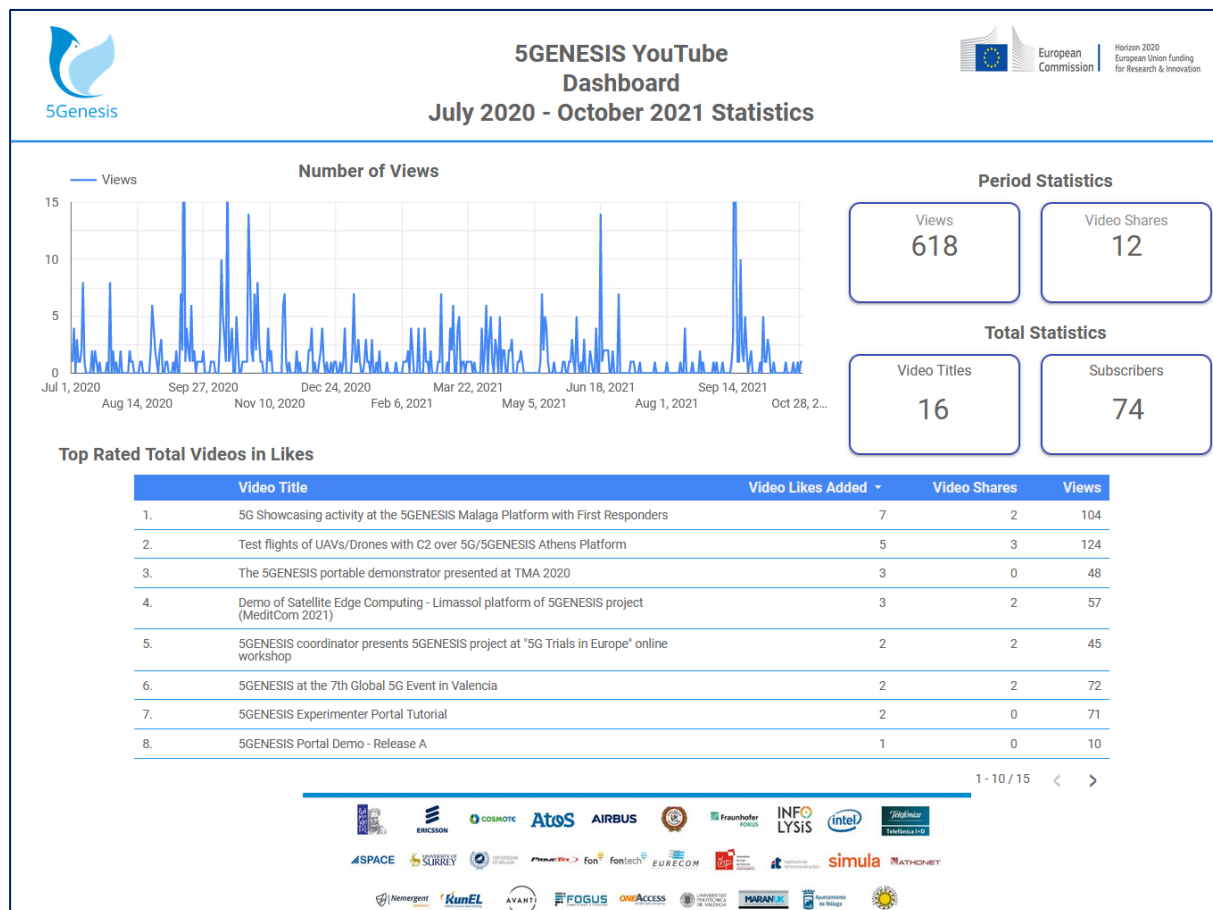


Figure 112 YouTube Dashboard

The Period 3 YouTube dashboard (<https://datastudio.google.com/reporting/208006b2-e3c3-4892-8fee-261d475d5dd8/page/qGMW>) follows the same visual pattern with the other 5GENESIS social media channels. A graph shows the number of views per date while a table informs the audience about the top rated in likes videos of 5GENESIS channel. Also, there is a section where period and total statistics are displayed. In total, 5GENESIS YouTube channel acquired 74 subscribers and posted 16 videos. Out of them, during Period 3 (up to the time this deliverable was finalised, early December), 8 videos were uploaded, 618 views made and 12 videos shares made. Please note that during December more videos (mainly from platform demos and showcasing are expected to be uploaded). Please note that several additional 5GENESIS videos (especially ones focused on trials) are made also available through the company channels of the partners (refer to section 4.3), raising in this way the total number of 5GENESIS videos for this period.

4.5. Dissemination and Communication Overall performance (M1-M41)

In the previous sections, this report has focused on analysing the activity of the 5GENESIS Project with respect to the 3rd period of its duration. Since the project is now on its final course it is important that we also present an overall evaluation of the dissemination and communication activities for the whole project duration. Thus, this section summarises all the

communication and dissemination activities/metrics as per **the full period of the project, July 2018 (M1) up to November 2021 (M41)**. It is important to mention that until the very last moment this deliverable was under continuous editing and review for keeping it updated even with the very last activities prior its final submission to the EC portal.

Table 21 summarizes the total communication activities of the 5GENESIS project (M1-M41).

Activity during M1-M41	M1-M41 Achievements
Communication channels used	1 website and 5 social media channels
Total Number of News posted in Website (News webpage)	>240 News posted
Total Dissemination Activities communicated through the 5GENESIS Website (until early December)	60 publications 17 white papers 66 presentations 22 workshops/CFPs 48 articles/press releases/interviews 7 poster sessions 19 panel discussions >75 events >20 Demonstrations
Total website visitors	>19.077 visitors
Total website hits	>52.873 hits
Total website sessions	>25.422 sessions
Total Number of Posts in Social Media channels	>1974 posts/tweets (2.74 posts weekly average per channel)
Total Number of Followers in Social Media channels	>2302 followers (1117 Twitter, 745 LinkedIn, 237 Facebook, 203 Instagram)
YouTube channel	19 videos
YouTube subscribers	75 subscribers
YouTube views	>1598 views
Newsletter issues published	14 issues (final issue to be released early January 2022)
Leaflets	4 versions, 1000 printed pieces
Posters	3 versions
Stickers	500 pieces

Table 21. 5GENESIS Communication total activities

Table 22 summarizes the total activities of the 5GENESIS project in comparison with the initial targets that were set in the proposal phase per category. The categories are publications (in journal and conference, workshops and general publications), workshops, presentations, conference panels, other activities (business days, booths, etc.) and demonstrations. **It is worth mentioning that 283 dissemination activities have been performed in total, surpassing the set goal/KPI of the 138 activities.** Potentially more activities might be performed during December and after the end of the project which are not included in this report.

Activity	Goals	Total Activities (M1-M41)
Publications (in Journals/Conferences)	25 in journals/conferences/workshops	60
Publications (in Workshops)	25 general publications (50 in total)	57 general (117 in total)
General Publications (White Papers, Articles, Books, Websites, Newspapers)		
Workshops (organized by 5GENESIS, co-organized with other projects, participation)	24	22
Presentations (in Conferences, Workshops, InfoDays, Events)	24	67
Participation in Conference Panels and Invited Talks	11	19
Others (Exhibitions, Business Days, Booths in Conferences, Poster Sessions, Awards)	19	33
Demonstrations in industrial/exhibitions and scientific events	10	25
Total Activities (M1-M41)	>138	283

Table 22. 5GENESIS dissemination total activities

4.5.1. 5GENESIS Full Period Dashboards (M1-M40)

This section presents the total statistical dashboards of the 5GENESIS website and social media channels, providing to any interested stakeholder a clear summary of the website and social media channels functionality through the project's lifetime. Please note that the recorded period of the dashboards is from May 2018 (M1) up to October 2021 (M40) (since final months' statistics processing was not available when this deliverable was finalised).

- Website Statistical Dashboard

<https://datastudio.google.com/reporting/681e28fe-d240-4ae8-bff8-eb89d1097c77>

Figure 113 outlines the total activity of the 5GENESIS website. As it can be seen the dashboard is split in different sections. There are two infographics which give information about the sessions and the users per sessions. Also, there is a pie which gives insights about the path that visitors followed to reach the website. For instance, the majority (56.6) of the visitors used the Google search engine machine. The second most popular choice (31.7) was the direct access to the website. Finally, the dashboard has also a part where the period statistics are mentioned. Up to end of October 2021, the 5GENESIS website has acquired 19,077 users, 52,509 page views and 25,422 number of sessions while the average session duration was 1 minute and 51 seconds.

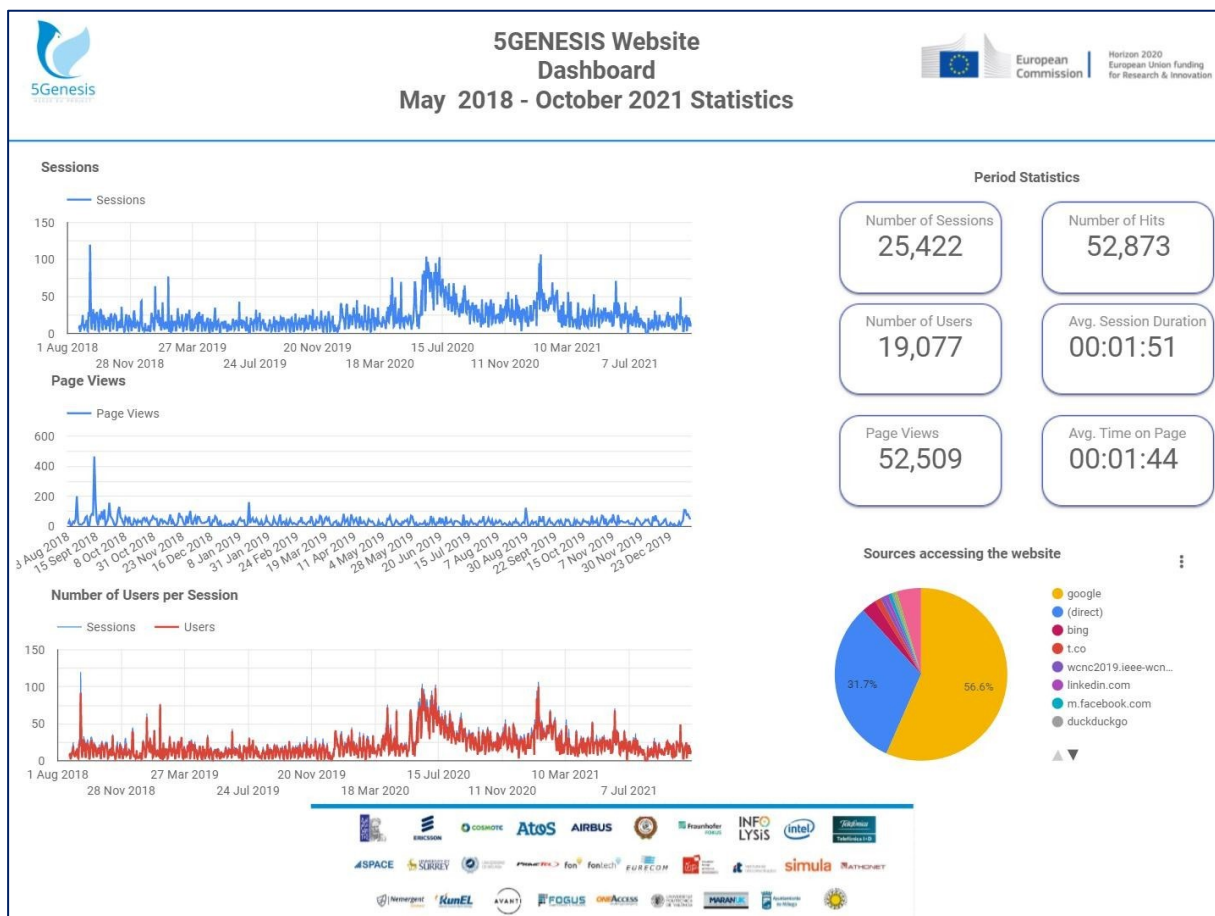


Figure 113 Website Total Statistical Dashboard

- LinkedIn Statistical Dashboard

<https://datastudio.google.com/reporting/681e28fe-d240-4ae8-bff8-eb89d1097c77>

The total statistics of LinkedIn are depicted in Figure 114 and Figure 115. In these dashboards, diagrams give information about the number of posts, likes and reshares, the post likes and the number of views. There is also a drop-down list where any viewer can browse through different top-rated posts.

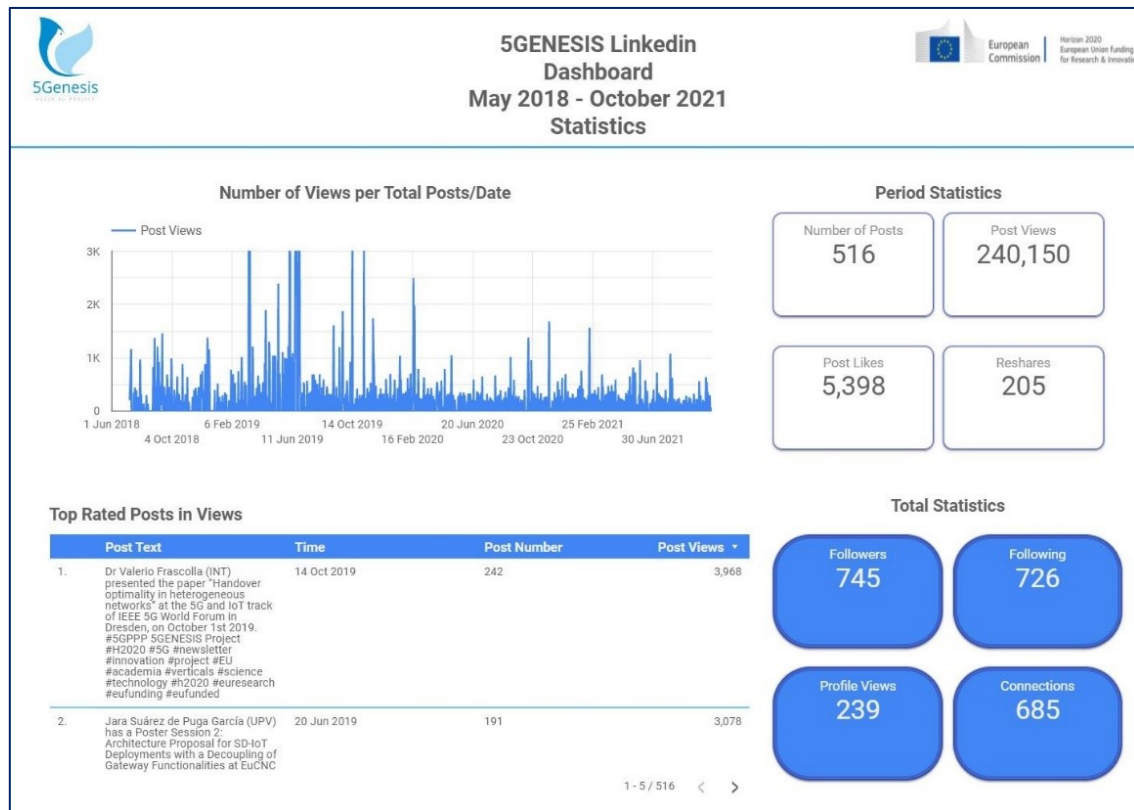


Figure 114 LinkedIn Total Statistical Dashboard

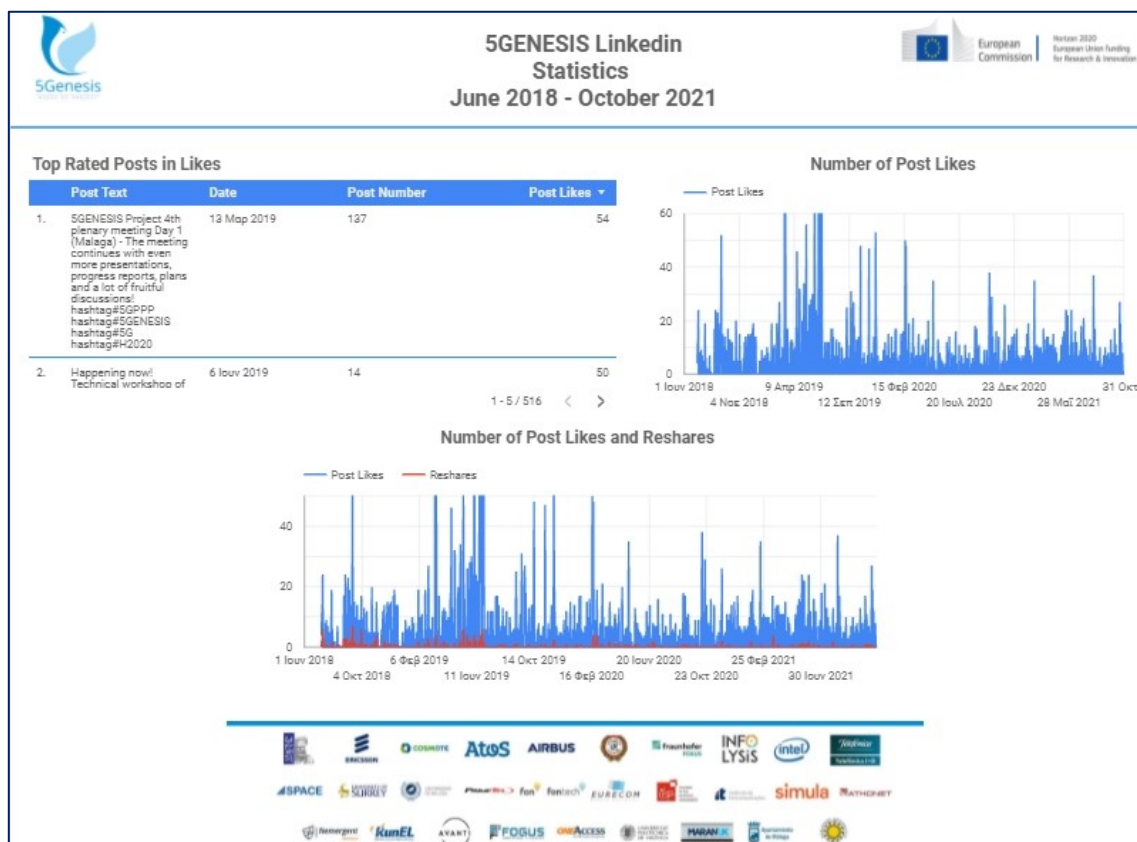


Figure 115 LinkedIn Total Statistical Dashboard – 2nd page

Finally, there two areas in the dashboard shown in Figure 114 where period statistics and total statistics are mentioned. The 5GENESIS LinkedIn account has acquired in total 745 followers, 5,398 post likes in 516 posts and 240,150 post views.

- **Twitter Statistical Dashboard**

<https://datastudio.google.com/reporting/0d18c2e6-9d55-4744-aa73-c5f4cd366a70>

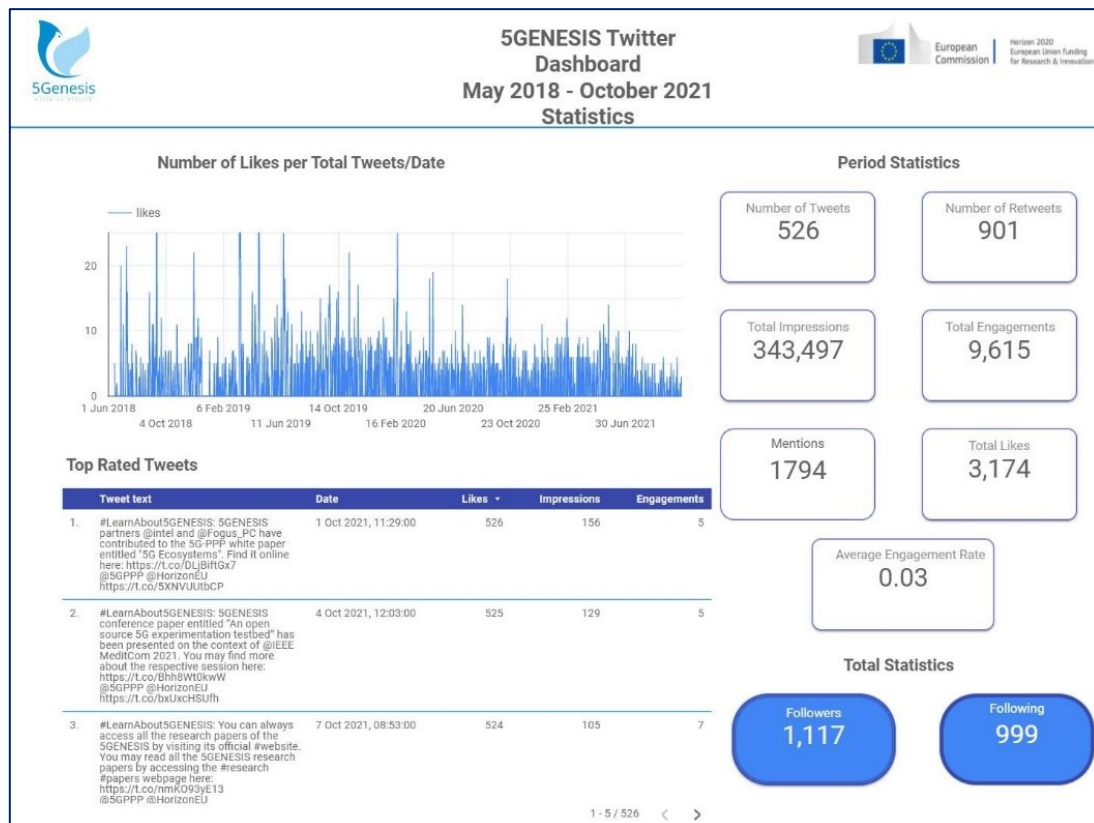


Figure 116 Twitter Total Statistical Dashboard

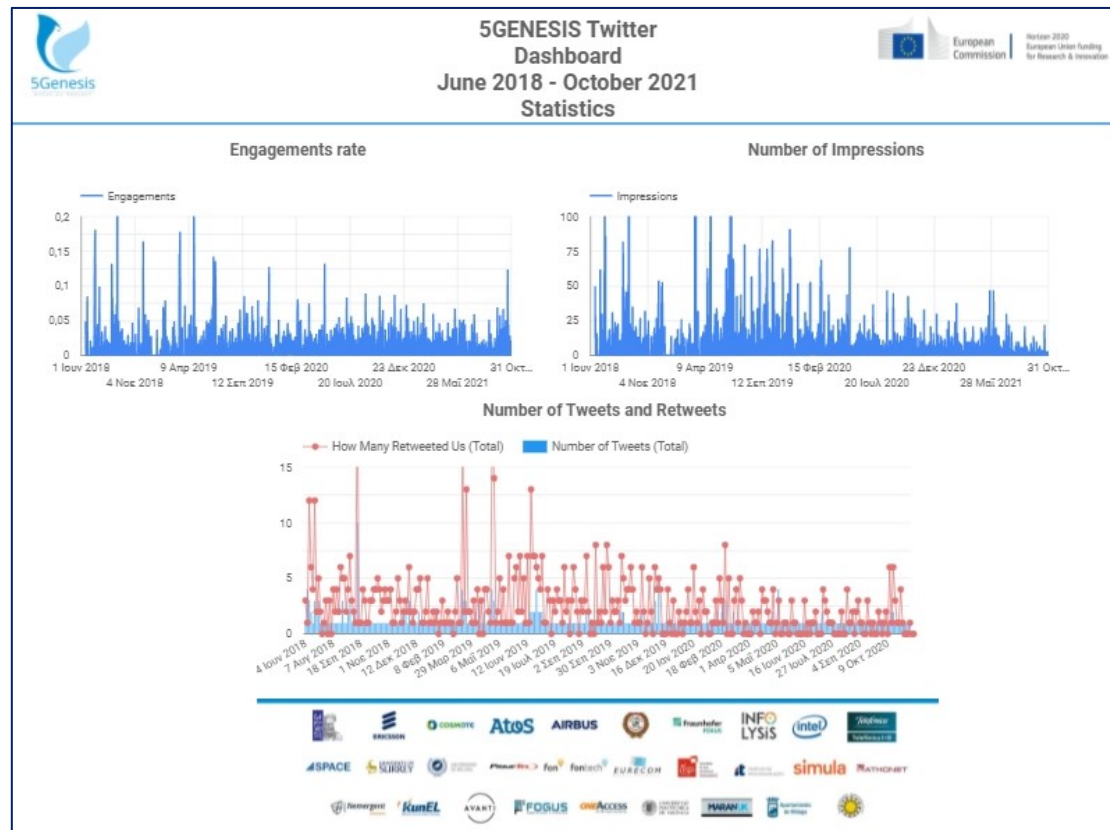


Figure 117 Twitter Total Statistical Dashboard – 2nd page

In the Twitter dashboards (Figure 116 and Figure 117), the infographic sections briefly guide us through the likes per tweet activity, engagement rate, number of impressions and number of tweets and retweets, a table with the top-rated posts of the mentioned period as well as period and total statistics part. 5GENESIS Twitter has acquired 1,117 followers, 3,174 likes in 526 tweets and a total engagement of 9,615.

- Facebook

<https://datastudio.google.com/reporting/02fc3b18-5005-4843-82e3-2e9d21e30a60>

The 5GENESIS Facebook page dashboards (Figure 118 and Figure 119) give information through graphs and visual metrics about the page views, the people who reached the page, the engagement rate and page likes per date, the top-rated activity through the dropdown list and the period and total statistics.

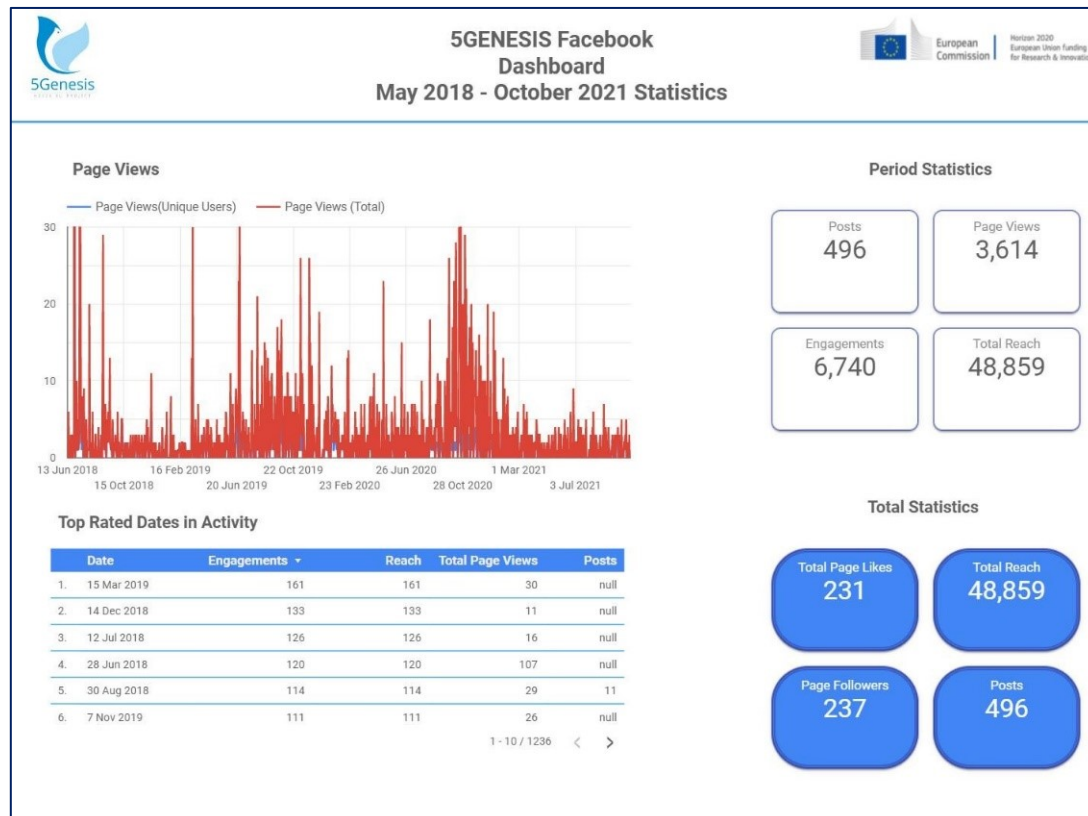
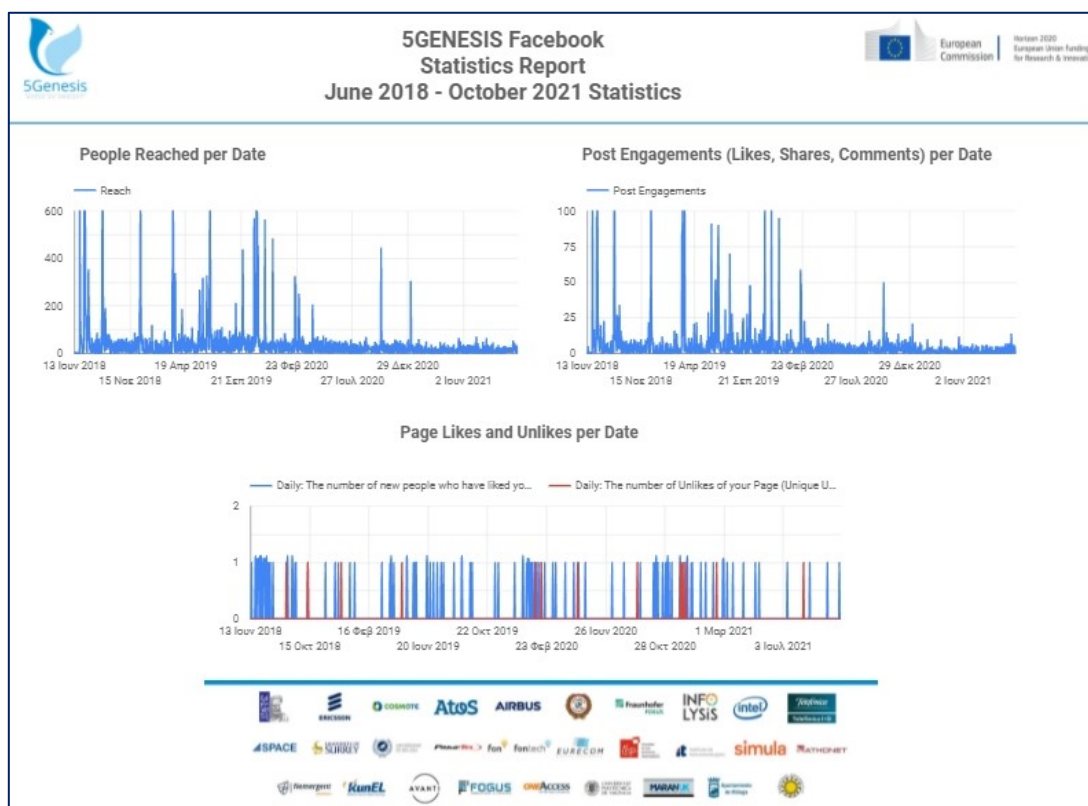


Figure 118 Facebook Total Statistical Dashboard

Figure 119 Facebook Total Statistical Dashboard – 2nd page

In total, the 5GENESIS Facebook page was followed by 237 people, had 48,859 total reach, and 3,614 page views, while 496 posts have been made till the end of October 2021.

- Instagram Dashboard

<https://datastudio.google.com/reporting/b451a4c4-7442-4402-b957-e95038fb815c>

The statistical dashboard of Instagram is provided in Figure 120.

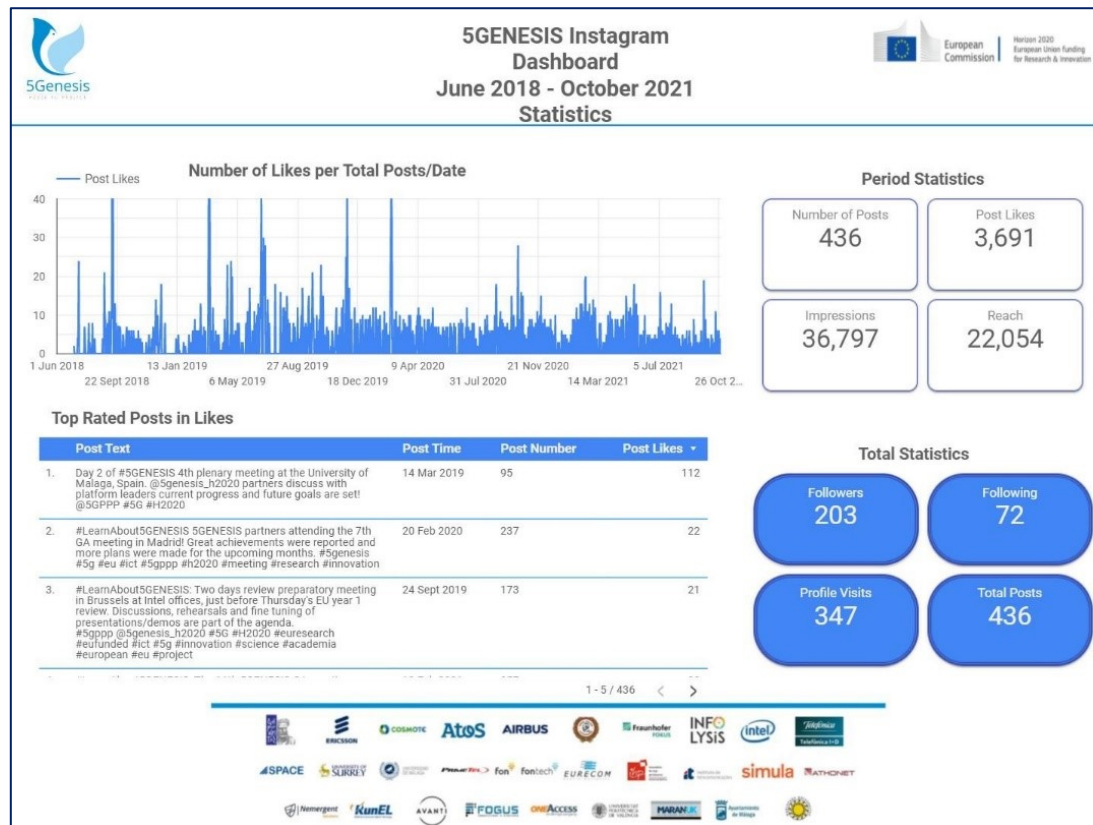


Figure 120 Instagram Total Statistical Dashboard

As it can be clearly seen the infographic of the dashboard gives insights about the number of likes per post and the dropdown lists categorizes the top-rated posts in likes. Totally, 5GENESIS Instagram channel has acquired 3,691 likes in 436 posts, 203 followers and 36,797 impressions.

5. 5GENESIS IN THE 5G-PPP PROGRAMME

5.1. Purpose and Objectives

The majority of the 5GENESIS consortium partners participate in several 5G-PPP organized activities with the purpose to align, impact and synergize with the 5G-PPP Working Groups (WG). This stream of activities has been very important to ensure that the outcomes of the 5GENESIS project are aligned with what was happening in the surrounding international research ecosystem, and that the main achievements, especially the technical ones, could get proper visibility in the research community and impact on the society in the broad sense.

5.2. Contributions to 5G-PPP

Since the beginning of the project, most of the 5GENESIS consortium partners have been actively participating (and will continue to do so even the end of the project) in the 5G-PPP organized activities.

Ongoing monitoring activity has been performed by the partners following the most important 5G-PPP WGs, and – when the case – contributions from the 5GENESIS project were discussed in the WG telcos or at the face-to-face workshops organized by the 5G-PPP association, or even communicated through 5G-PPP communication channels (5G-PPP website, newsletter, newsflash, social media) and published in the form of white papers.

The 5GENESIS project has appointed several partners to contribute to 5G-PPP WGs as described in the Table 23 below:

Working Group	Main representative	Main representative Company / Organisation	Second representative	Second representative Company / Organisation
5G-PPP Steering board	Dr. Harilaos Koumaras	NCSR Demokritos	Dr. Anastasios Kourtis	NCSR Demokritos
5G-PPP Technical Board	Prof. Pedro Merino Gomez	University of Malaga	Dr. Dimitris Tsolkas	Fogus
5G-PPP Comms	Dr. Valerio Frascolla	INTEL	Dr. Jesus Gutierrez Teran	IHP
Pre-Standardization WG	David Artuñedo Guillen	Telefonica	Dr. Valerio Frascolla Arthur Lallet	INTEL Airbus DS SLC
Spectrum WG	Prof. Eckhard Grass	IHP	Antonio Morgado	IT Portugal

5G Architecture WG	Dr. Jesus Gutierrez Teran	IHP	David Artuñedo Guillen, Dimitris Tsolkas, Valerio Frasca	Telefonica, FOGUS, INTEL
Software Networks WG	Dr. Alejandro Fornés Leal	Polytechnic University of Valencia	David Artuñedo Guillen	Telefonica
Vision and Societal Challenges WG	Dr. Valerio Frasca	INTEL	Dr. Jesus Gutierrez Teran	IHP
Security WG	Dr. Georgios Gardikis	Space Hellas	Arthur Lallet	Airbus DS SLC
SME WG	Eneko Atxutegi	Nemergent	Vaios Koumaras	INFOLYSiS P.C.
Trials WG	Prof. Pedro Merino Gomez	University of Malaga	David Artuñedo Guillen, Dr. Valerio Frasca	Telefonica, INTEL
IMT-2020 Evaluation Group	Dr. Fotis Lazarakis	NCSR DEMOKRITOS	Dr. Valerio Frasca	INTEL
Test, Measurement and KPI Validation (TMV)	Alberto Florez Pages	Telefonica	Almudena Diaz Zayas	University of Malaga

Table 23. 5GENESIS representatives per 5G-PPP Working Group

5.2.1. 5GENESIS in 5G-PPP Steering board and Technology Board

- **SB meetings**

Dr. Harilaos Koumaras, as project coordinator of 5GENESIS project, participated in all planned Steering Board meetings of 5G-PPP either physically or remotely, during the pandemic period.

During the SB meetings, the progress of the various WGs was monitored, while corrective actions and clarifications were provided, considering the collaboration of ICT-17 projects with ICT-19, as well as the continuation of the 5G-PPP after the end of H2020 and the starting date of SNS. More specifically, 5GENESIS, together with the other active funded 5GPPP projects contributed financially to the continuation of the 5G-PPP during this time gap between the two work programmes.

In specific, 5GENESIS was represented by Dr. Harilaos Koumaras at the following SB meetings:

- 21 July 2020
- 13 October 2020 (Full day meeting)

- 2 December 2020
 - 8 February 2021 (Full day meeting)
 - 7 April 2021
 - 20 July 2021 (Full day meeting)
 - 27 September 2021
 - 29 November 2021 (Full day meeting)
- **TB activities**

Pedro Merino and Dimistris Tsolkas, as TM and DTM, participated in most of the TB meetings and activities in this period on behalf of 5GENESIS. The most relevant topics discussed in the last 17 TB meetings (since July 2020) were the collection of Key Achievements v3.0, the promotion of white papers (AI/ML white paper Indoor 5G white paper, 5G Trials for Cooperative, Connected and Automated Mobility (CCAM) along European Cross-Border Corridors), the Verticals cartography, the Member State Initiative & Trials WG activities, the coordination of EUCNC 2021 participations, and the organization of two TB workshops. In the September 2020 TB workshop, Almudena Díaz and Dimitris Tsolkas presented the 5GENESIS: Testing Methodology. In the May 2021 TB workshop, the 5GENESIS representatives (Pedro Merino, Dimitris Tsolkas and Harilaos Koumaras organized the Session on “Exposing APIs in experimental platforms: lessons learnt and expectations”. The next TB workshop is planned for 18th and 19th January 2022.

5.2.2. 5G-PPP Comms

One 5GENESIS representative, Dr. Valerio Frascolla, has been constantly attending all the calls of the WG on Communication, led by Jacques Magen. Scopes of the WG is to align and share the latest news among 5G-PPP-related projects on all sort of dissemination activities: workshops panels, special session organized by a project, journal and special session driven by a project of the 5G-PPP family. Such calls have been instrumental to align the dissemination activities of 5GENESIS with all that was at the same time happening in the ecosystem, and allowed 5GENESIS to reach the broadest possible audience, thanks to the service provided by the COMM WG, e.g., sharing through mails main dissemination and communication activities resulting out of a project activity.

5.2.3. Interactions with the 5G-PPP WGs

5.2.3.1. Pre-Standardization WG

During the period 5GENESIS has actively contributed to the following items:

- B5G/6G Standardization Roadmap creation: the main purpose of this activity was to provide a “tool” in order to help projects to make impact, e.g., suggesting what kind of research output should be produced in a given moment in time, in order to be ready when SDO may use such results. 5GENESIS took part in the work around this topic and especially to the:
 - Elaboration of the 6G vision
 - Coordination activities with other WGs in order to avoid conflicts

- Input from 5GENESIS companies on their B5G/6G vision and roadmap
 - B5G/6G Roadmap report (v2)
- SDO impact survey: 5GENESIS contributed to the survey by providing the most notable achieved impacts of the project on the relevant 5G standards and helping at identifying areas of improvement to maximise technology transfer “from research to standards” for future research frameworks.
- Webinar participation:
 - “3GPP Release 18: Opportunities for Industry Verticals” Webinar which took place on the 30th of November 2020. During this workshop the industry vertical view points and technical requirements were presented and an interactive session was done between verticals and 3GPP TSG chairs.

5.2.3.2. Spectrum WG

There has been no activities during the reporting period in this WG.

5.2.3.3. Architecture WG

The project Presentations re-started in November 2020 and the “5GENESIS Architecture for experimentation in 5G” was presented on the 11th of December 2020. This presentation focused on the 5GENESIS objectives and platforms overview and on the 5GENESIS reference architecture.

5GENESIS took part in the WG meetings and worked on the main WG activity which is the “View on 5G Architecture” whitepaper v4.0 (<https://5g-ppp.eu/wp-content/uploads/2021/11/Architecture-WP-V4.0-final.pdf>) and were 5GENESIS contributed to the following chapters:

- Chapter 4 “Core & Transport Architecture” contributed by Dimitris Tsolkas and Jesús Gutiérrez on data analytics,
- Chapter 5 “Automated Management & Orchestration Architecture” by Dimitris Tsolkas on the Slice Manager,
- Chapter 7 “Architecture Instantiations and Validations” by Dimitris Tsolkas on the End-to-End performance validation.

Also, two of our partners were the lead editors in two of the above mentioned chapters:

- Chapter 4 “Core & Transport Architecture”, Jesus Gutiérrez
- Chapter 6 “Cross-Domain Aspects”, Valerio Frascolla and Jesus Gutiérrez

5.2.3.4. Software Networks WG

The 5GENESIS representatives attended all the relate Software Networks WG meetings and activities of the reporting period, and participated in the planning and execution of the task carried out:

- The Edge Computing Whitepaper, released on February 2021.
- Proposals for workshops in 2021.

- The new Terms of Reference for 2021, approved in June 2021. After focusing on cloud native in the past, the WG shifts its focus to platform design, APIs, and the identification of key technological challenges to transform networks to a more open model. The following thematic objectives have been proposed:
 - Disaggregation of Network Functions as Microservices.
 - Cloud-Native Service Orchestration.
 - APIs and open model.
 - The role of NetApps in 5G platforms.
 - Vertical-oriented Enabling Functions.
 - Network intelligence capability enhancement for service and orchestration.
 - Service programmability including life cycle management, deployability of services on-the-fly, execution services anywhere in the infrastructure and migrating them transparently to different domains.
 - Large scale experimentation with 5G Software Networking including verification for KPIs, service and networks metrics and non-functional requirements.
- The API/NetApp White Paper called “From VNF to API: Opening up 5G and beyond networks to verticals”, expected to be released in the first quarter of 2022.

5.2.3.5. Vision and Societal Challenges WG

A 5GENESIS representative, Dr. Valerio Frascolla, attended all meetings and calls of the Sub-WGs:

- Business Validation, Models, and Ecosystems (BVME) Sub-Group
- Member State Initiatives SubGroup
- Societal needs and value creation Subgroup

Relevant information discussed during the calls, and input from the 5GENESIS perspective, were exchanged between the participants of the sub-WGs calls and the project partners during WP7 calls. That way a fruitful and timely exchange of important information was guaranteed from both sides. Dr. Valerio Frascolla provided direct contributions to the quarterly reports of the three reported above Sub-WGs, being also main reviewer of the white paper created by the BVME subgroup, leveraging on the outcomes of the 5GENESIS Innovation Programme and the business oriented workshops driven during the 5GENESIS lifetime, as described in D7.10.

5.2.3.6. Security WG

The 5GENESIS representatives attended all the teleconference calls and provided their views on the 2021 security white papers which were:

- SWP1 “Access Control Mechanisms to Verticals” (slice oriented)
- SWP2 “SDN/NFV virtualization, 5G Slicing and Security Considerations”
- SWP3 “5G Attack Referential”
- SWP4 “(critical) Vertical security needs”

5.2.3.7. SME WG

5GENESIS representatives attended all the relate SME WG meetings and activities of the reporting period:

- On 14th September 2020: The main topic of the SME WG general assembly telco was the upcoming formation of Smart Networks and Services (SNS PPP) partnership that follows the 5G-PPP at Horizon Europe program, and the representation of SMEs in it.
- On 4th November 2020:
 - Finalization and approval of the SME WG Smart Networks and Services (SNS) Position Paper
 - Goal: initial position of the SME WG on the upcoming Smart Networks and Services (SNS) Partnership within Horizon Europe
 - Approval: SME WG members (approval) => NetWorld2020 Steering Board => 5G IA Board
- The SME WG prepared and released a Position Paper related to the participation and contribution of SMEs in the upcoming Smart Networks & Services (SNS) Partnership in Horizon Europe (January to May 2021).
- 1st March 2021, during the SME WG general assembly telco, all members got updated on the Smart Networks and Services (SNS PPP) partnership and discussed about the participation of SME in ICT-41 and ICT-52 projects
- Contributions to the NetworldEurope website update, new SMEs brochure and “Find your SME” web page were made by all participating to the SME WG partners.
- INFOLYSIS and NEMERGENT contributions related to the update of “Find Your SME” webpage <https://www.networldeurope.eu/find-the-sme-you-need-new-page/>
- Contributions to SMEs brochure new release were made (<https://bscw.5g-ppp.eu/pub/bscw.cgi/d437286/2021-07%20SME%20Brochure.pdf>)
- European DIGITAL SME Alliance and the NetworldEurope SME WG workshop (16 Sept 2021) attended by INFOLYSIS as SME WG member of 5GENESIS

The latest SME WG general assembly meeting took place online on Monday 15 November 2021. Attended by NEM and INF on behalf of 5GENESIS. Topics discussed: SNS partnership program, Feedback from Horizon Europe initial calls, Feedback from the 1st joint workshop between the SME WG and the European DIGITAL SME Alliance, proposal for new workshop on Components for 6G, discussion on the open letter “The EU needs an effective digital markets act”. It was also highlighted that there will be no new update of the SME web page or brochure before at least mid-2022, when the new CSA supporting 5G-PPP and NetworldEurope shall be launched.

5.2.3.8. Trials WG

5GENESIS contributed to the 5G Infrastructure PPP Trials and Pilots Brochure n°3 which was released in October 2021:

https://5g-ppp.eu/wp-content/uploads/2021/10/5GInfraPPP_10TPs_Brochure2021_v1.0.pdf

The brochure contains the 5GENESIS trial "5GENESIS: Mobile Video Public Safety" of the 5GENESIS Malaga platform (page 10)". The full video is available on the 5GENESIS YouTube channel at <https://www.youtube.com/watch?v=9H6OkjX74iw&t=33s>. The 5GENESIS

contributors are the University of Málaga, the Municipality of Málaga and Telefónica. Dr. Valerio Frascolla took over at the beginning of 2021 the role of champion of the Trial WG Sub-WG related to 5G Verticals, representing 5GENESIS in all Trial WG calls and providing inputs to the ongoing-to-be-published new white Paper (current assumption is in Q2 2022) on “5G Advanced Verticals moving towards 6G”, whose lead editor will be Dr. Valerio Frascolla.

5.2.3.9. IMT-2020 Evaluation Group

There has been no activities during the period for this WG.

5.2.3.10. Test, Measurement and KPI Validation (TMV)

5GENESIS representatives attended all the meetings. In detail:

- Following the meeting on the 8th of September 2020, the updated 5GENESIS deliverable D6.1 “Trials and experimentation” was provided to the WG on the 5G-PPP BSCW.
- The white paper on results “Understanding the Numbers - Contextualization and Impact Factors of 5G Performance Results” was a major work during the period. All the projects with results, including 5GENESIS, gave their available results as an input. The final version (V1.0) was release in July 2021.
- Towards the end of the period, the WG started to have discussions about the next steps. It was decided to focus on 6G test and measurement aspects and 6G KPIs.
- The WG also started a white paper around the monitoring of 6G networks KPI. The expected outcome is to identify the current and future 6G KPI monitoring needs. The whitepaper will acknowledge the contribution from the participating projects. The goal is to provide the final version of the white paper by March 2022 at the latest.
- The WG is finalising the first version of the “Basic Testing Guide - A Starter Kit for Basic 5G KPIs Verification” whitepaper.
- The whitepaper on “KPIs Measurement Tools - From KPI definition to KPI validation” has just been started in November 2021. The initial table of contents contains section about 5G KPIs, how to perform a measurement, the available tools, the available frameworks, and the data infrastructure.

5.3. Interaction with other projects

5GENESIS supports as platform the experimentation and execution of trials for four H2020 projects, namely 5G!Drones, 5GHEART, 5G-VICTORY and INSPIRE-5GPlus.

5.3.1. 5GENESIS interaction with other projects

5.3.1.1. 5G!DRONES

5G!Drones project is an ICT-19 H2020 especially focused on the Drones vertical industry, considering trials and experiments that are exploiting the advantages of the 5G network

towards supporting novel and promising use-cases, such as opportunistic 5G networks with drones, UAS integration in 5G etc.

During the last 18 months of the project, 5GENESIS supported the execution of two 5G!DRONES experiments in a 5GENESIS platform. More specifically:

- 5G!Drones partners conducted drone flights and technical tests at the Stavros Mavrothalassitis Stadium in Municipality of Egaleo, Athens, Greece on 19 October 2020 as part of the 5G!Drones project trials (Use case #4: Connectivity during crowded events) over 5GENESIS 5G Athens platform. 5G!Drones team tested the control of drone flights over a 5G communication network provided by NCSR Demokritos.

Location: Municipal Stadium of Egaleo (5GENESIS Athens platform), Greece

Date: 19-20 October 2020

Semi-autonomous flight, but also the use of edge/LBO was tested using the Open5GENESIS suite and gathering KPIs and metrics.

YouTube Video (Day 1): <https://www.youtube.com/watch?v=LGX8Z-AWr5A>



Figure 121 Egaleo Trials Day 1

Trials and UAV flights continued also on day 2 (20 Oct 2020).



Figure 122 Egaleo trials Day 2

YouTube Video (Day 2): <https://www.youtube.com/watch?v=cA5KtmxrHY4>

On 21st October 2020, 5G!Drones partners successfully completed feasibility test related to the 5G!Drones Use Case #4 scenario (Connectivity during crowded events) at OTE Academy premises, in Athens, Greece.

YouTube Link: <https://www.youtube.com/watch?v=FiwrNOyLmjw>



Figure 123 COSMOTE Academy Trials

- In July 2021, trials were performed at the Athens 5GENESIS platform, using the Cosmote site as Access Network with LBO and NCSRD site hosted the 5G Core. 5G!Drones UC4 (Connectivity during crowded events) was tested on the 5GENESIS Athens 5G experimental platform at COSMOTE Academy premises in Athens. UAV flights and 5G parameters/KPIs were measured and analysed under different flight scenarios and patterns. Vital conclusions were extracted from these trials. The trials ran for 5 days (28 June – 2 July 2021) with involved partners DEM, COS and communication of the event and results by INF.



Figure 124 Joint 5GDRONES and 5GENESIS Trials

5.3.1.2. 5GHEART

The ICT-19 5G-HEART project will be trialling various use cases on the 5GENESIS Surrey platform. As such, 5G-HEART has been closely interacting with 5GENESIS to ensure full synchronisation between the capabilities of its Surrey node and the target use cases of 5G-HEART.

The list of 5G-HEART use cases expected to make use of the 5GENESIS facility is as follows:

- T3S1: Teleoperated support (TeSo)
- T4S5: End-to-end (E2E) slicing
- T4S6: Vehicle sourced high definition (HD) mapping
- T1S1&T1S2: High bandwidth in-vehicle Situational awareness and see-through
- T2S3: Quality of service (QoS) for advanced driving
- T4S3: Smart traffic corridors
- T4S4: Location based advertising
- T4S7: Environmental services

To date, use cases T4S5, T4S6, T4S3, T4S4 and T4S7 have made use of the 5GENESIS facilities, although trials were limited to 4G only, aiming to establish baseline performance.

5G use by all the use cases mentioned above is planned for Phase 3 of the 5G-HEART project, starting in January 2022 (the schedule was affected by COVID-19 and access related restrictions).

5.3.1.3. 5G VICTORY

As already presented in deliverable D7.3, 5G-VICTORI extends the ICT-17 5GENESIS experimental platform towards an operational environment – a railway station: the Berlin Central Station – with the provision of a portable 5G system together with compute and storage HW and upgrades of the existing 5GENESIS components to accommodate the 5G-VICTORI use cases. These use cases do involve the implementation of the different 5G service classes: eMBB, uRLLC and mMTC on top of this 5G system and are related to Future Mobility, Mission Critical communications and Content Delivery Networks (CDNs) to mobile rolling stock [REF D2.1, D2.2 5G-VICTORI].

The 5GENESIS Fraunhofer FOKUS and IHP sites are being equipped with state-of-the-art technologies consisting of sophisticated and high performance DCs, indoor and outdoor deployments of edge/transport and access components for internal testing and validation of experiments in urban ultra-dense areas.

Thanks to the flexibility and openness of the 5GENESIS blueprint architecture we can easily accommodate the access to the Berlin Platform and the definition and execution of experiments to vertical industries stemming from 5G-VICTORI. IHP has lately made an investment in 5G NR equipment to be fully compatible with that used in 5GENESIS that will

allow the pre-testing of the 5G network and services prior to the final integration at Berlin Central Station.

The common equipment to be used involve as well proprietary IHP's V-Band terrestrial backhaul solutions (see 5GENESIS D3.12), which are based on an upgrade of 60 GHz mmWave solutions developed during 5GENESIS. The equipment connecting central and edge sites, cloud infrastructure and MANO servers, 5G core, edge computing, and monitoring, analytics and KPI evaluation support for the assessment of infrastructure-related KPIs.

The Open5GCore 5G Core Network from FhG FOKUS – used in 5GENESIS – will be deployed in a railway station at the office area, where the user plane functions will enable lower latency and better throughput for data connections to support the locally deployed services. Besides this, a full edge computing deployment based on that used in 5GENESIS will be collocated in the office area encompassing the shared compute and storage resources. The full-chain monitoring and analytics framework developed in the context of 5GENESIS and the Open5GENESIS Suite will be used in 5G-VICTORI to provide Access to vertical industries and to validate the proper function of the network components. Finally, the 5G-VICTORI Berlin facility will be able to create and adapt the interfaces for the support of the aggregation of measurements to enable 5G network KPI evaluation making use of the 5GENESIS KPI evaluation framework.

5.3.1.4. INSPIRE-5Gplus

Grounded in an integrated network management system and relevant frameworks, INSPIRE-5Gplus is entirely devoted to improve security at various dimensions, i.e., overall vision, use cases, architecture, integration to network management, assets, and models. In this framework, INSPIRE-5Gplus developments in security and slice management, such as the Security Service Blockchain for Network Slice Broker could further evolve the developments of the Open5GENESIS Suite.

5.4. Releases of the Open5GENESIS suite

During the last period of the project, the final Release B of Open5GENESIS Suite was published at the GitHub account of the project (<https://github.com/5genesis>).

The Open5GENESIS Coordination Layer provides the baseline functionalities that allows the experimentation in the different 5Genesis platforms.

Release A provided initial support for the execution of Tests Cases and the collection of results, while Release B implements the whole automation cycle and additional features that enhance the experimentation capabilities and KPI validations for the vertical Experimenters. In a nutshell, the prominent features available after the installation of the Release B codebase are:

- Portal
 - User registration
 - Experiment creation and execution
 - Experiment logs and raw results visualization
 - Access to the Analytics Dashboard
 - Network Service onboarding interface

- Support for the execution of distributed experiments
- Dispatcher
 - User management and access control
 - MANO Enabler:
 - Validation of VNFDs and NSDs
 - VIM image uploading
 - VNFD and NSD listing and updating
 - Artifacts repository integrated with ETSI OSM
 - Experiment validation
- ELCM
 - Experiment execution, access to runtime status
 - Automatic handling and storage of execution logs
 - Orchestration of external components:
 - Integration of the OpenTAP framework
 - Support for generic script execution
 - Ready to use Tasks for common integrations
 - Extensible via plugins for various infrastructure elements and components
 - Testbed resources management
 - Integration with the Katana Slice Manager:
 - Automatic deployment/decommission of Network Services during experiment
 - Support for the execution of distributed experiments
- Monitoring and Analytics
 - Analytics Dashboard:
 - Data visualization
 - Prediction
 - Correlation
 - Feature selection
 - Statistical analysis
 - Statistical processing and report on selected KPIs
- Slice Manager
 - Start/Stop/Inspect end-to-end network slices
 - Open APIs supported by swagger-io tool
 - Lightweight web user interface
 - Integrated Command-Line Interface (CLI) tool
 - Modular architecture supporting different infrastructure technologies
 - Slice deployment and configuration time measurement
 - Prometheus Node exporter
 - Message Broker
 - Slice Optimization Module
- NMS
 - WAN Infrastructure Manager (WIM)
 - Software Defined Network (SDN) Control
 - Monitoring
 - TAP plugins for controlling Android devices and computers through Secure Shell (SSH)

- Performance monitoring tools for Android: resource usage, latency and throughput probes
- Remotely controlled latency and throughput probes for Personal Computer (PC)

6. CONCLUSION

Deliverable D7.4 depicts 5GENESIS outreach activities as well as interactions with 5G-PPP and other projects, that took place during the third and final period of the project (July 2020 - December 2021). In this deliverable interested stakeholders can find a thorough presentation, reporting and evaluation of the activities that took place during the recorded period.

In conclusion, 5GENESIS has fulfilled all the targets/KPIs identified for its third period as well as the goals that have been set for its whole lifetime.

Some key points concerning this deliverable and the activities described here are:

- An accurate and continuous monitoring procedure of all the activities was provided.
- The individual targets that were planned for each outreach activity were met and communication tools used were presented and evaluated
- The members of the consortium showed an extensive enthusiasm concerning the impact creation, communication and dissemination activities
- Active interaction with ICT-19 and ICT-20 projects continued also in the third period of the project
- Notable contributions were provided, and active roles were taken in the framework of 5G-PPP, including very active participation in most of the WGs, the preparation of white papers and other material such as reports and brochures.
- The website and the social media of the project will continue to be live for at least 2 years after the finalization of the project.
- Some impact activities may not have been recorded in this report until its submission since ongoing impact activities still will take place during December and at least until project final review in March 2022 and its official closure.

7. ANNEX 1 – MONTHLY 5GENESIS SOCIAL MEDIA STATISTICAL DASHBOARDS (JULY 2020-OCTOBER 2021)

7.1. Twitter Monthly Statistical Dashboards (M25-M40)

In the following sections, the monthly statistical dashboards of Twitter, referring to the third period of the project, are provided.

Twitter Statistical Dashboards

- July 2020

[Twitter 5GENESIS Dashboard July 2020](#)

- August 2020

[Twitter 5GENESIS Dashboard August 2020](#)

- September 2020

[Twitter 5GENESIS Dashboard September 2020](#)

- October 2020

[Twitter 5GENESIS Dashboard October 2020](#)

- November 2020

[Twitter 5GENESIS Dashboard November 2020](#)

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[Twitter 5GENESIS Dashboard March 2021](#)

- April 2021

[Twitter 5GENESIS Dashboard April 2021](#)

- May 2021

[Twitter 5GENESIS Dashboard May 2021](#)

- June 2021

[Twitter 5GENESIS Dashboard June 2021](#)

- July 2021

[Twitter 5GENESIS Dashboard July 2021](#)

- August 2021

[Twitter 5GENESIS Dashboard August 2021](#)

- September 2021

[Twitter 5GENESIS Dashboard September 2021](#)

- October 2021

[Twitter 5GENESIS Dashboard October 2021](#)

7.2. LinkedIn Monthly Statistical Dashboards

In the next sections, the monthly statistical dashboards of LinkedIn for the period three of the project, along with their URLs, are provided.

LinkedIn Statistical Dashboards

- July 2020

[LinkedIn 5GENESIS Dashboard July 2020](#)

- August 2020

[LinkedIn 5GENESIS Dashboard August 2020](#)

- September 2020

[LinkedIn 5GENESIS Dashboard September 2020](#)

- October 2020

[LinkedIn 5GENESIS Dashboard October 2020](#)

- November 2020

[LinkedIn 5GENESIS Dashboard November 2020](#)

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- June 2021

[LinkedIn 5GENESIS Dashboard June 2021](#)

- July 2021

[LinkedIn 5GENESIS Dashboard July 2021](#)

- August 2021

[LinkedIn 5GENESIS Dashboard August 2021](#)

- September 2021

[Linkedin 5GENESIS Dashboard September 2021](#)

- October 2021

[Linkedin 5GENESIS Dashboard October 2021](#)

7.3. Facebook Monthly Statistical Dashboards

In the following sections the monthly statistical dashboards of Facebook, for the third period of the project, with their URLs, are available.

Facebook Statistical Dashboards July 2019

- July 2020

[Facebook 5GENESIS Dashboard July 2020](#)

- August 2020

[Facebook 5GENESIS Dashboard August 2020](#)

- September 2020

[Facebook 5GENESIS Dashboard September 2020](#)

- October 2020

[Facebook 5GENESIS Dashboard October 2020](#)

- November 2020

[Facebook 5GENESIS Dashboard November 2020](#)

- December 2020

[Facebook 5GENESIS Dashboard December 2020](#)

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- May 2021

[Facebook 5GENESIS Dashboard May 2021](#)

- June 2021

[Facebook 5GENESIS Dashboard June 2021](#)

- July 2021

[Facebook 5GENESIS Dashboard July 2021](#)

- August 2021

[Facebook 5GENESIS Dashboard August 2021](#)

- September 2021

[Facebook 5GENESIS Dashboard September 2021](#)

- October 2021

[Facebook 5GENESIS Dashboard October 2021](#)

7.4. Instagram Monthly Statistical Dashboards

In the following sections the monthly statistical dashboards of Instagram referring to the third period of the project are provided along with their URLs.

Instagram Statistical Dashboards

- July 2020

[Instagram 5GENESIS Dashboard July 2020](#)

- August 2020

[Instagram 5GENESIS Dashboard August 2020](#)

- September 2020

[Instagram 5GENESIS Dashboard September 2020](#)

- October 2020

[Instagram 5GENESIS Dashboard October 2020](#)

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- August 2021

[Instagram 5GENESIS Dashboard August 2021](#)

- September 2021

[Instagram 5GENESIS Dashboard September 2021](#)

- October 2021

[Instagram 5GENESIS Dashboard October 2021](#)

8. ANNEX 2 – MONTHLY 5GENESIS WEBSITE STATISTICAL DASHBOARDS (JULY 2020-OCTOBER 2021)

8.1. Website Statistical Dashboards

In the following sections the monthly statistical dashboards of 5GENESIS website, referring to the third period of the project, are provided. The 5GENESIS website statistical dashboards are issued and distributed internally on a monthly basis to all the WP7 members, via the WP7 mailing list, and are used for monitoring the performance and impact that the website has to its audience.

- July 2020

[5GENESIS Website Dashboard July 2020](#)

- August 2020

[5GENESIS Website Dashboard August 2020](#)

- September 2020

[5GENESIS Website Dashboard September 2020](#)

- October 2020

[5GENESIS Website Dashboard October 2020](#)

- November 2020

[5GENESIS Website Dashboard November 2020](#)

- December 2020

[5GENESIS Website Dashboard December 2020](#)

- January 2021

[5GENESIS Website Dashboard January 2021](#)

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- April 2021

[5GENESIS Website Dashboard April 2021](#)

- May 2021

[5GENESIS Website Dashboard May 2021](#)

- June 2021

[5GENESIS Website Dashboard June 2021](#)

- July 2021

[5GENESIS Website Dashboard July 2021](#)

- August 2021

[5GENESIS Website Dashboard August 2021](#)

- September 2021

[5GENESIS Website Dashboard September 2021](#)

- October 2021

[5GENESIS Website Dashboard October 2021](#)

9. ANNEX 3 – QUARTERLY ISSUES OF 5GENESIS NEWSLETTER (JULY 2020-OCTOBER 2021)

9.1. Newsletter Issue 9

<https://5genesis.eu/newsletter-issue-9/>

9.2. Newsletter Issue 10

<https://5genesis.eu/newsletter-issue-10/>

9.3. Newsletter Issue 11

<https://5genesis.eu/newsletter-issue-11/>

9.4. Newsletter Issue 12

<https://5genesis.eu/newsletter-issue-12/>

9.5. Newsletter Issue 13

<https://5genesis.eu/newsletter-issue-13/>

9.6. Newsletter Issue 14

Still under editing the time this deliverable was submitted. Planned to be released by middle of January 2022.