ENLIGHT'EM

European Training Network in Low-Energy Visible Light IoT Systems

Innovative Training Networks (ITN)

H2020-MSCA-ITN-2018

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Final report on dissemination and exploitation results

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Contributors

All beneficiaries and partners.

Abstract

Results of dissemination and outreach activities completed during the third year of the project by the partners and beneficiaries within the scope of ENLIGHT'EM project.

Revision History

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0.0	Borja Genovés	12/05/2022	Created initial template.
0.1	Sercan Karaağaç	07/11/2023	Updated the document per beneficiary inputs
0.2	Javier Hervás	13/12/2023	Last update
1.0	Domenico Giustiniano	18/12/2023	Final revision

Executive summary

This document captures Dissemination and Exploitation Results for the third year of the project of the ENLIGHT'EM project partners. The present Final Annual Report on Dissemination and Exploitation Results – prepared within the Dissemination and Outreach Work Package (WP5) – will ensure that dissemination activities from various WPs and the project in general are captured, and well presented.

The document includes all the dissemination, communication and outreach efforts. Results of the tasks such as the review and mapping of stakeholders at European, national and local levels, timing of communication and dissemination activities, media channels, and division of tasks between partners are detailed.

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List of Abbreviations

ENLIGHT'EM	European Training Network in Low-energy Visible Light IoT Systems Project
MSCA	Marie Skłodowska-Curie Action
ITN	Innovative Training Networks
ETN	European Training Networks
ESR	Early Stage Researcher
SB	Supervisory Board
IPR	Intellectual Property Rights
IP	Intellectual Property
IoT	Internet of Things
VLC	Visible Light Communication
LiFi	Light Fidelity

1. Introduction

ENLIGHT'EM is training the next generation of researchers in energy efficient IoT systems based on VLC. This project consolidates pan-European collaborations among leading groups in the field, and it is fostering its contribution to the consolidation of the 5G ecosystem by developing low-energy VLC systems and also plans to feed into standardization activities. Disseminating the results of such research and explaining its impact on the design of IoT systems that leverage the low baseline energy consumption of LEDs is an important objective of the ENLIGHT'EM project.

In this report, all research, dissemination, and exploitation activities, carried out during the third year of the project are provided as a summary as reported by the project partners.

1.1. Responsibilities and Points of Contact

The following table lists the main network wide bodies responsible for the dissemination and outreach activities tasks of ENLIGHT'EM and the updated list of responsible project participants constituting the respective bodies.

Table 1: Contact persons details

Contact person	**Role**	**Institution**
Sercan Karaağaç, skaraag1@ford.com.tr	WP5 - Dissemination and Outreach lead	FORD
Ilenia Tinnirello, ilenia.tinnirello@unipa.it	T5.1 – Academic Dissemination Lead	UNIPA
Daniele Puccinelli, daniele.puccinelli@supsi.ch	T5.2 – Communication and Outreach Lead	SUPSI
Rui Bian,	T5.3 – Exploitation and Impact Plan Lead	PLF

rui.bian@purelifi.com		

2. Dissemination Results

This section presents dissemination activities in which ENLIGHT'EM participants have been involved during the final year of the project (from June 2022 to December 2023). These activities have been used by ESRs to disseminate the ENLIGHT'EM outcomes.

TU Delft

- Osterlee, Oxana; **Xu, Talia**; Zúñiga, Marco. Paper**:** "Inti: Indoor Tracking with Solar Cells"**.** The International Conference on Embedded Wireless Systems and Networks (EWSN 2022), Linz, Austria, 3-5 October **2022**
- De Groot, Lucan; **Xu, Talia**; Zúñiga, Marco**.** Paper**:** "DroneVLC: Exploiting Drones and VLC to Gather Data from Batteryless Sensors"**.** The 21st International Conference on Pervasive Computing and Communications (PerCom 2023), Atlanta, United States, 13-17 March **2023**
- **Ye, Hanting**; Xiong, Jie; Wang, Qing. "When VLC Meets Under-Screen Camera". ACM International Conference on Mobile Systems, Applications, and Services (ACM MobiSys) , Helsinki, Finland, 18-22 June 2023
- **Ye, Hanting**; Lan, Guohao; Jia, Jinyuan; Wang, Qing. "Screen Perturbation: Adversarial Attack and Defense on Under-Screen Camera". The 29th Annual International Conference On Mobile Computing And Networking (ACM MobiCom) 2-6 Oct 2023, Madrid, Spain

University of Applied Sciences and Arts of Italian Switzerland (SUPSI)

- **Dalgic, Omer**; Puccinelli, Daniele; Zuñiga, Marco. "Enabling Body-Centric Computing Applications with LED-to-Camera Communication". ACM BodySys'22, (Portland, ORE, USA) 1 July
- **Dalgic, Ömer**; Singh, Jagdeep; Farnham, Tim; Puccinelli, Daniele. "Augmenting a Smartphone Camera with a Tele Lens photo for Enhanced LED-to-Camera Communication". Workshop on Optical Wireless Communication, 2023 co-located with IEEE Wireless Communications and Networking Conference, Glasgow, United Kingdom, 26-March

LightBee Corp (LBEE)

- **B.Majlesein**, V.Matus, C,Juradu-Verdu, V.Guerra, J.Rabadan and J.Rufo. "Experimental Characterization of Sub-Pixel Underwater Optical Camera Communications" at the 13th IEEE/IET International Symposium on Communication Systems, Networks & Digital Signal Processing (CSNDSP) on 20-22 July 2022 at Porto/Portugal.
- **Majlesein Behnaz**; Geldard Callum; Guerra Yanez Victor; Rufo Torres Julio; Popoola Wasiu; Rabadan Borges Jose has presented their research entitled "Empirical Study of Underwater Optical Camera Communication System under Turbulent Conditions" at the Optic Express Journal. Vol. 31, Issue 13, 2023. ISSN: 1094-4087.
- **Behnaz Majlesein**; Geldard Callum T.; Victor Guerra; Luna-Rivera, J.M.; Julio Rufo; Poopola Wasiu; Jose Rabadan; has presented their research entitled "Experimental Study of Wavy Surface Effects on Uplink Water-Air Optical Camera Communication" at the 29th Annual International Conference on Mobile Computing and Networking (MOBICOM 2023).
- **Majlesein Behnaz**; Guerra Yanez Victor; Rufo Torres Julio; Rabadan Borges Jose; Perez Jimenez Rafael; has presented their research entitled "Evaluation of Communication Link Performance and Charging Speed in Self-Powered Internet of Underwater Things Devices" at the IEEE Access Journal. Vol. 10, 2022. ISSN: 2169-3536.

IMDEA Networks (IMDEA)

- **Mir, Sarmad**, Genovés, Borja; Varshney, Ambuj; Giustiniano, Domenico "LiFi for Low-Power and Long-Range RF Backscatter" IEEE Transactions on Networking, 2023 Accepted for publication.
- **Frometa Fonseca, Dayrene**; Genoves Guzman, Borja; Martena, Giovanni Luca; Bian, Rui; Haas, Harald; Giustiniano, Domenico "A prediction-model-assisted reinforcement learning algorithm for handover decision-making in hybrid LiFi and WiFi networks" Journal of Optical Communications and Networking, 2023.
- Genovés, Borja; Mir, Sarmad; **Frometa, Dayrene**; Galisteo, Ander; Wang, Qing; Giustiniano, Domenico; (May 2023) "Prototyping Visible Light Communication for the

Internet of Things Using OpenVLC" IEEE Communications Magazine (Volume: 61, Issue: 5, May 2023).

- Genovés, Borja; Talavante, Javier; **Frometa, Dayrene**; Mir, Sarmad; Giustiniano, Domenico; Obraczka, Katia (May 2023) Accepted for publication "Towards sustainable greenhouses using battery-free LiFi-enabled Internet of Things" IEEE Communications Magazine, (Volume: 61, Issue: 5, May 2023).
- Martena, Giovanni Luca; Sperga, Janis; **Frometa, Dayrene**; Bian, Rui; Genovés, Borja; Sufyan Islim, Mohamed; Kosman, John; Haas, Harald (May 2023) "A Simulation Tool for Interference Analysis in MIMO Wavelength Division LiFi Indoor Networks" IEEE ICC 2023 Workshop on Industrial Private 5G-and-beyond Wireless Network (CFP), Rome, Italy, 28 May – 1 June.
- **Frometa, Dayrene**; Mir, Sarmad; Genovés, Borja; Giustiniano, Domenico (January 2023) "Visible Light or Infrared? Modulating LiFi for Dual Operation in the Visible and Infrared Spectra" IEEE Wireless On-demand Network Systems and Services, Madonna di Campiglio, Italy, 30 January- 1 February.
- **Frometa Dayrene**; Mir, Sarmad, Genovés, Borja; Varshney, Ambuj; Giustiniano, Domenico (October 2023) Demo: "Rethinking LiFi for Low-Power and Long Range RF Backscatter" The 29th Annual International Conference On Mobile Computing And Networking (ACM MobiCom) 2-6 Oct 2023, Madrid, Spain.
- **D. Frometa**, Borja Genoves, D. Giustiniano, J. Widmer, "A System Architecture for Battery-free IoT Networks", The 31st IEEE International Conference on Network Protocols (ICNP 2023) Reykjavik, Iceland, October 10-13, 2023.

The University of Edinburgh (UEDIN)

- **Burak Özyurt** and Wasiu have published, and presented a paper at "IEEE Wireless Communications and Networking Conference" The name of the paper is "Analysis of Over-the-Air Time Synchronization for Industrial LiFi Networks".
- **Burak Özyurt**, Harald Haas, Rui Bian, and Wasiu have published, and presented a paper at "IEEE Wireless Communications and Networking Conference" The name of the paper is "Energy and Spectral Efficiency of Multi-Tier LiFi Networks".
- **Burak Ozyurt** and Wasiu O Popoola have published a paper on "Comp-jt scheme for d2d communication in industrial lifi networks", at the IEEE Access.

- **Tilahun Gutema**, Harald Haas, and Wasiu O Popoola has published a paper "On Symbol Error Performance of Probabilistic Shaping in Noise-Limited and Fading Channels" at IEEE Open Journal of the Communications Society).
- **Tilahun Gutema** has completed his PhD studies and his **PhD dissertation** in "Enhanced energy and spectrum efficiency in visible light communications" in March 2023.

PureLiFi (PLF)

PureLiFi has contributed to dissemination with the following activities:

- Frometa Fonseca, Dayrene; Genoves Guzman, Borja; **Martena, Giovanni Luca**; Bian, Rui; Haas, Harald; Giustiniano, Domenico "A prediction-model-assisted reinforcement learning algorithm for handover decision-making in hybrid LiFi and WiFi networks" Journal of Optical Communications and Networking, 2023
- **Janis Sperga**, Rui Bian, and Harald Haas has presented their research with subject "Beam Selection in Angle Diversity MIMO Systems for Optical Wireless Systems" at the IEEE International Conference on Communications (ICC) that is held in Seoul/ South Korea on 16-20 May 2022.
- **Janis Sperga** has presented his research with subject "Thin Receiver Freeform Lenslet Concentrator Array for LiFi" at the IEEE International Conference on Communications Workshops (ICC Workshops) that is held in Rome/Italy during 28 May to 1 Jun 2023.
- **Janis Sperga** has submitted to ICC 2024 with title: "Adaptive Generalized Space Shift Keying Algorithm for FPGA Implementation"
- **Janis Sperga** has submitted to ICC 2024 with title: "Photodiode Arrays Do Not Violate the Second Law of Thermodynamics: Photocurrent Bandwidth Trade-off"
- **Giovanni Luca Martena** has presented his research with subject "A Simulation Tool for Interference Analysis in MIMO Wavelength Division LiFi Indoor Networks" at the IEEE International Conference on Communications Workshops (ICC Workshops) that is held in Rome/Italy during 28 May to 1 Jun 2023.

- **Giovanni Luca Martena** has submitted to ICC 2024 with title: “Downlink Time-Dependent Performances of a WDMA-MIMO LiFi Network”.

Ozyegin University (OZU)

- Tettey, Daniel K. ; **Ali Mahmoodi, Khadijeh**; Bonakdar, Roozbeh; Uysal, Murat Poster: “Vehicular Visible Light Communications with A Solar Panel Receiver” The 29th Annual International Conference On Mobile Computing And Networking (ACM MobiCom) 2-6 Oct 2023, Madrid, Spain
- **Ali Mahmoodi, Khadijeh**; Elamassie, Mohammed; Uysal, Murat “Operation Altitude Optimization of Solar-Powered Rotary-Wing UAVs for FSO Backhauling” Sixth International Balkan Conference on Communications and Networking (BalkanCom), Istambul, Turkey, 5-8 June

University of Palermo (UNIPA)

During the third year of the project, Kien Trung Ngo finalized three conference papers, among which one contribution including the results achieved during the secondments in Toshiba. More into details, the ESR, with he supervision of Prof. Tinnirello and Mangione, presented the following contributions:

- **Trung Ngo, Kien**, Giuliano, Fabrizio; Croce, Daniele; Mangione, Stefano; Tinnirello, Ilenia; Garbo, Giovanni “Hybrid VLC/WiFi Architectures with Priority Feedback Channels” FITCE 2022 Rome, Italy, 29-30 September
- **Trung Ngo, Kien**; Giuliano, Fabrizio; Mangione, Stefano; Farnham, Tim; Tinnirello, Ilenia “Seamless Handover in Hybrid VLC and WiFi network: a testbed scenario” The 12th International Conference on Communications, Circuits, and Systems (ICCCAS), Singapore, 5-7 May 2023
- **Trung Ngo, Kien**; Mangione, Stefano; Tinnirello, Ilenia. Poster: “A Novel Intelligent Management System Architecture for Hybrid VLC/RF Systems in Smart Retail Environment” The 29th Annual International Conference On Mobile Computing And Networking (ACM MobiCom) 2-6 Oct 2023, Madrid, Spain

- Kien Ngo was honored with the "Best Poster Award" at the ACM MobiCom 2023 conference, with the work above published in ACM.
- Additionally, Kien Ngo achieved “Third-Place winner” in the MobiCom 2023 Student Research Competition, also held during the ACM MobiCom 2023 conference.
- Trung Ngo, Kien; Mangione, Stefano; Tinnirello, Ilenia (Forthcoming). "Intelligent Management System for Hybrid Network VLC and RF: Architecture and Applications". This paper is currently in final internal review and will be submitted for publication soon.

Toshiba Research Europe Ltd. (TREL)

- **Singh, Jagdeep**; Farnham, Tim; Wang, Qing Poster: “When BLE Meets Light: Multi-modal Fusion for Enhanced Indoor Localization”. The 29th Annual International Conference On Mobile Computing And Networking (ACM MobiCom) 2-6 Oct 2023, Madrid, Spain

- **Singh, Jagdeep**; Baddeley, Michael; Boano, Carlo Alberto; Stanoev, Aleksandar; Chai, Zijian; Wang, Qing; Raza, Usman “BLoB: Beating-based Localization for Single-antenna BLE Devices” **BEST PAPER AWARD** International Conference on Embedded Wireless Systems and Networks (EWSN), Rende, Italy, 25-27 September 2023.

- Li, Peizheng; **Singh, Jagdeep**; Cui, Han; Boano, Carlo Alberto. "BmmW: A DNN-based Joint BLE and mmWave Radar System for Accurate 3D Localization" **BEST PAPER AWARD**
  19th Annual International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT 2023), Coral Bay, Cyprus, 19-21 June 2023

- Li, Peizheng; **Singh, Jagdeep**; Cui, Han; Boano, Carlo Alberto. "BmmW: A DNN-based Joint BLE and mmWave Radar System for Accurate 3D Localization" Pervasive and Mobile Computing Journal, 2023. June (Special Issue- Invited Paper)

- Dalgic, Ömer; **Singh, Jagdeep;** Farnham, Tim; Puccinelli, Daniele “Augmenting a Smartphone Camera with a Tele Lens photo for Enhanced LED-to-Camera Communication” Workshop on Optical Wireless Communication, 2023 co-located with

IEEE Wireless Communications and Networking Conference, Glasgow, United Kingdom, 26-March 2023

- **Singh, Jagdeep**; Watkinson, Dan; Farnham, Tim; Puccinelli, Daniele "Detecting and Controlling Smart Lights with LiTalk" ACM MORSE workshop co-located with ACM MobiCom 2022, Sidney, Australia, 21-October 2022

- **Singh, Jagdeep**; Wang, Qing; Zúñiga, Marco; Farnham, Tim "HueSense: Featuring white LEDs through Hue Sensing" **BEST PAPER AWARD** ACM MORSE workshop co-located with ACM MobiCom 2022, Sidney, Australia, 21-October 2022

Ford Otosan (FORD)

Daniel K. Tettey and Bismillah Nasir Ashfaq have reported the following dissemination activities during this year.

- **Daniel K. Tettey, Bismillah Nasir Ashfaq**, Mohammed Elamassie, and Murat Uysal presented a research paper on the subject: "Experimental Investigation of MISO Vehicular Visible Light Communication under Mobility Conditions," to be presented at the 2023 IEEE Virtual Conference on Communications (IEEE VCC), held as virtually on 28-30 November 2023.
- **Bismillah Nasir Ashfaq, Daniel K. Tettey**, and Murat Uysal presented a research paper on the subject: "FPGA-Based Implementation and Experimental Demonstration of a Vehicular VLC System," in IEEE Virtual Conference on Communications, 28-30 November 2023, Virtual.
- **Daniel K. Tettey**, Mohammed Elamassie, and Murat Uysal presented a research demo paper on the subject of "Demo: SDR-based Implementation of Adaptive OFDM LiFi System," at the 2nd Abu Dhabi 6G Summit held in Abu Dhabi, UAE, on 16-17 November 2023.
- **Bismillah Nasir Ashfaq, Daniel K. Tettey**, and Murat Uysal presented a research poster paper on the subject of "Poster: "Experimental Demonstration of Vehicular Visible Light Communications," in 6G Summit 2023, 16-17 November 2023, Abu Dhabi, UAE.
- **Daniel K. Tettey**, Mohammed Elamassie, and Murat Uysal presented a research paper on the subject of "Implementation of Software-Defined Adaptive OFDM for Vehicular

VLC," at the 2nd 2023 International Conference on 6G Networking (6GNet 2023) held in Paris, France, on 17-20 October 2023.

- **Daniel K. Tettey**, Mohammed Elamassie, and Murat Uysal presented a research paper on the subject of "Experimental Investigation of Angle Diversity Receiver for Vehicular VLC," at the 29th Annual International Conference on Mobile Computing and Networking (ACM MobiCom), held in Madrid, Spain, on 2-6 October 2023.
- **Daniel K. Tettey**, Khadijeh Ali Mahmoodi, Roozbeh Bonakdar and Murat Uysal presented a research paper on the subject of "Vehicular Visible Light Communication with a Solar Panel Receiver," at the 29th Annual International Conference on Mobile Computing and Networking (ACM MobiCom), held in Madrid, Spain, on 2-6 October 2023.
- Ibrahim Bağlıca, **Bismillah Nasir Ashfaq**, Sude Ergin, Burak Kebapçı, Tuncer Baykas and Murat Uysal presented a research paper on the subject: "Experimental Demonstration of an FPGA-Based Outdoor VLC Broadcasting System," in 31st Signal Processing and Communications Applications Conference (SIU), Istanbul, Turkiye, 2023, pp. 1-4, doi: 10.1109/SIU59756.2023.10223788.

3. Communication and Outreach

Communication through open electronic media

IMDEA has been in charge of promoting and disseminating the results of the events organized within the ENLIGHT'EM project.

IMDEA is updating the website of the project with every new event and result obtained from the project.

The following table shows the activity of ENLIGHT'EM in open electronic media, with the aim of disseminating outcomes and drawing the attention of the general public.

Table 2: Activity in open electronic media during the whole project*

Social Network Channel	**Activity**
YouTube	Current content: 77 Videos, 8 Playlists, 98 subscribers Views: 9.600 times, 336 hours, 42.700 impressions
Twitter	326 Tweets, 116.900 Impressions 555 Following, 163 Followers
LinkedIn	501 Views, 102 Followers

*Due to a change in the metrics system of the different media we are providing the figures about the whole project.

Communication through the formal press, radio or tv

TeleMadrid, the public television channel of the Region of Madrid, released a news about IMDEA Networks research, covering the work done on LiFi with the participation of Dayrene Frometa:

https://www.telemadrid.es/programas/telenoticias-1/Madrid-lider-en-investigacion-0-2590840933--20230825024528.html

Communication through public events

The following communication activities to the public at large have taken place to disseminate the project implications on the possibility to provide affordable, low-cost and low-energy technologies for Internet access.

Behnaz Majlesein (LightBee), Damon Ye (TU Delft), Jagdeep Singh (Toshiba) and Ömer Dalgiç (SUPSI) participated in the Eurpean Researchers' Night 2022 Vienna with a Presentacion of our work in LiFi Technology. The European Researchers' Night is a Europe-wide public event, which displays the diversity of science and its impact on citizens' daily lives in fun, inspiring ways. This year, the event took place in 25 countries on Friday 30 September 2022. (Link to the event: https://enlightem.eu/results/communication/european-researchers-night-2022-vienna/)

Ngo Trung Kien and his supervisors Ilenia Tinnirello (Professor), Stefano Mangione (Associate Professor), participated in this edition present the "Internet Of Lights" topic, to raise public awareness about Visible Light Communication (VLC). The goal of "Internet of Light" event is to show all the potential of VLC to the public and VLC's applications that can bring a massive impact on society. During the event, we prepared an introductory presentation on Visible Light Communications and its applications, followed on request on a more technical presentation about issues related to the integration between VLC and WiFi. (Link to the event: https://enlightem.eu/results/communication/european-researchers-night-2022-palermo/)

In what follows, we list the activities for communication by the single beneficiaries:

IMDEA:

- 13th IMDEA Networks Annual International Workshop:

https://networks.imdea.org/whatsnew/events-agenda/13th-imdea-networks-annual-international-workshop/

- IMDEA attended the Madrid City & Science Biennial 2023:

https://networks.imdea.org/imdea-networks-at-the-madrid-city-science-biennial-2023/

UNIPA:

Ngo Trung Kien, Ilenia Tinnirello, and Stefano Mangione attended the European Researcher's Night 2022, where they demonstrated the "Hybrid WiFi / VLC streaming application" to the public. A blog post about their demonstration can be found here: (Blog about the event)

Kien attended the International B5G Student Workshop to explore advanced research topics related to 5G and 6G technologies, IoT applications, and Artificial Intelligence in July 2023. He also promoted visible light communication, ENLIGHT'EM project and his own research topic. (Link for the event)

In September 2023, the same team showcased their "Intelligent Management System for Hybrid VLC and WiFi" at the public event, Internet of Lights - SHARPER Night. (Link to the event: Internet of Lights - SHARPER Night (sharper-night.it)) and a blog post about their demonstration can be found here: (Blog about the event)

TU Delft:

Talia Xu was part of the TU Delft team who participated in the "Science is Wonderful" event in Brussels in March 2023. https://enlightem.eu/tu-delft-in-siw2023/

4. Exploitation of results and intellectual property

Dayrene Frometa together with the LiFi4Food team participated in the Grand Final of the EIT Jumpstarter program, and won the first prize of the in the Food category.

Dayrene Frometa together with the LiFi4Food team was selected to in the EIT Seedbed Incubator program, receiving a 6K grant to perform the Market Discovery.

Dayrene Frometa Fonseca and Domenico Giustiniano submitted a 2 patents application to European authorities.

UNIPA co-organized and hosted a training event in Palermo (Dec. 12th and 13$^{th)}$, whose main goal was presenting some career opportunities to ESRs after a PhD, from the presentation of local success stories about the creation of start-up companies, to the discussion of the opportunities in large companies (clarifying some strategies for the assessment and the international dimension of the evaluation process) and to the presentation of other young entrepreneurship success stories.

TOSHIBA has filed a patent related to technologies developed by Jagdeep Singh during the project. These demonstrate the novelty and advantage of ENLIGHT'EM technologies for indoor localization:

Raza, U., Singh, J., Stanoev, A., & Marot, V. (2023).

U.S. Patent Application No. 17/453,386: Method and system for wireless localisation.

5. Conclusion

This document has summarized the dissemination activities of the last year of the ENLIGHTEM project. In particular, we have presented the summary of industrial and academic contributions. As can be seen from the report, dissemination activities through publications and conference presentations are progressing. Furthermore, the project partners have built a community through presentations to a broader public, and planning further dissemination initiatives, included specific workshops on the project themes.

Annex

Annex A: Official project event during last year of ENLIGHT'EM project

The following official project Events have been accomplished during the last year of the project:

Table 3: Main network-wide Training Events organized along the last year of the project

Main Training Events & Conferences		ECTS	Lead Institution	Completion Status
Event 7	Training on advanced research skills, tutorials at conference, and project meeting		Co-located with EWSN 2022 with all project partners	**Completed – October 2022 M41)**
Event 8	Industry day and project meeting		**FORD OTOSAN** Held on-site at Ford Otosan R&D Center in Istanbul	**Completed – July 2022 (M38)**
Event 9	ESR's skills in different topics like entrepreneurship, PhD defense, CV preparation		**Università degli Studi di Palermo** Palermo, Italy	**Completed – December 2022 (M43)**
Event 10	Final training event at conference and final project meeting		**Co-located with ACM MobiCom** Madrid, Spain	**Completed – October 2023 (M53)**