NEUROPULS

Deliverable 7.2

Update to the dissemination and communication plan : iteration 1

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Document Validation

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Document Abstract

The NEUROPULS project is an exciting Horizon Europe Project (Grant Agreement n° 101070238) focused on advancing neuromorphic computing by developing new, efficient hardware accelerators using innovative technologies like photonics, phase change materials, and III-V materials. This project aims to enhance computing power, security, and energy efficiency for a range of applications, from smart cars to the Internet of Things and beyond.

This document presents our plan for sharing the project's findings and connecting with important audiences, including researchers, industry experts, policymakers, and the public.

We outline a clear strategy to spread the word about NEUROPULS's breakthroughs through various channels, such as scientific articles, events, and social media.

Our goal is to make sure the project's results are well understood and used, helping to keep Europe at the leading edge of computing technology.

Table of contents

1. Introduction

In NEUROPULS project, dissemination and communication activities are implemented within WP7 "Dissemination and exploitation" which aims to ensure that the project's new material and corresponding research advances match with market opportunities and that scientific, social and economic impacts are based on the project's results. The task directly related to this deliverable is Task 7.1 Dissemination & Communication.

The objective for this deliverable is to present the dissemination strategy of the project.

The dissemination strategy of NEUROPULS will rely on:

- Creating the project visual identity and publishing the public dissemination materials via a dedicated project website;
- Designing and circulation of all templates for external communication by the partners ensuring that no patentable information is disclosed;
- Keeping track of all project publications and public disclosures;
- Informing all the partners of related events and conferences and encourage participation in the most relevant ones;
- Raise awareness about the project via the use of social networks ("X" ex-Twitter, LinkedIn) to spread the project results to the outside world.

Dissemination and communication are intrinsically linked to exploitation in the sense that efficient promotion is a facilitator of the exploitation of the project results during and after the project lifetime. Moreover, dissemination and communication allow to measure the acceptance of the proposed project concepts and their reuse. References to exploitation activities – which will be the subject of specific standalone deliverables - will therefore be made in this deliverable.

The current status of the different achievements towards the goals and measurable indicators are reported in this deliverable, thus giving the progress of the dissemination and communication activities and outlining the work to be done in the next months. This deliverable will be updated in March 2025, in March 2026 and at the end of the project in December 2026 to have the optimal means for attaining the objectives, thus constituting an essential tool to guide the activities of the Consortium throughout the lifetime of the project.

2. The project

2.1 Context

The NEUROPULS project is geared towards revolutionizing edge computing by developing next-generation photonic neural networks (PNNs) and security layers, responding to the growing need for efficient and secure data transfer among interconnected devices. By shifting computing closer to data sources, the project aims to enhance processing speed and reduce latency in various applications, from self-driving cars to IoT and industry 4.0. Leveraging the benefits of neuromorphic computing and photonic hardware, NEUROPULS addresses traditional electronic systems' limitations, such as high energy consumption and latency. A key innovation is the introduction of photonic physical unclonable functions (PUFs) to provide robust security against sophisticated attacks, overcoming the vulnerabilities of electronic PUFs. Integrating advanced materials and technologies, the project aspires to create secure, low-power neuromorphic accelerators that offer superior energy efficiency and serve as a new benchmark for edge computing solutions.

2.2 Objectives

Key objectives include the development of a CMOS-compatible platform that combines silicon photonics with advanced materials for high-performance computing, the creation of low-power and secure neuromorphic accelerators with RISC-V interfaces, and the establishment of a comprehensive system-level simulation platform. These accelerators are designed to support a wide range of neural network operations, from spiking to recurrent networks, with enhanced scalability and security features. By addressing these objectives, NEUROPULS aspires to set new standards for neuromorphic computing, offering significant improvements over current state-of-the-art technologies in terms of security, efficiency, and flexibility.

2.3 Partnership

The NEUROPULS consortium is coordinated by the CNRS (P01), France.

The NEUROPULS consortium is composed of 13 partners and 2 linked affiliated entities.

Academic Institutions

P01.1 ECOLE CENTRALE DE LYON

P01.2 UNIVERSITE DIJON BOURGOGNE

P03 UNIVERSITEIT GENT

P04 POLITECNICO DI TORINO

P09 ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON

P10 LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN (Terminated on 05/07/2023).

P12 UNIVERSITA DEGLI STUDI DI VERONA

P13 TECHNISCHE UNIVERSITAT BERLIN

Research and Technology Organisation (RTO)

P01 CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

P02 COMMISSARIAT A L'ENERGIE ATOMIQUE

P05 INSTITUTO DE ENGENHARIADE SISTEMAS E COMPUTADORES, INVESTIGACAO E DESENVOLVIMENTO EM LISBOA

P06 BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION

Small and Medium Entreprises (SMEs)

P08 ALBORA TECHNOLOGIES SL

P11 ARGOTECH AS

Large Companies / Industrials

P07 HEWLETT PACKARD ENTERPRISE BELGIUM

3. Definitions

In the context of this report, we consider the following definitions from the Horizon Europe references (EC Research & Innovation Participant Portal Glossary/Reference Terms and IPR Helpdesk).

By signing the EC Grant Agreement participants agree to:

Promote the action and its results by providing targeted information to multiple audiences (including the media and the public), in accordance with Annex 1 and in a strategic, coherent, and effective manner. (Article 17.1 of the Model Grant Agreement).

Disseminate results — as soon as feasible — in a publicly available format, subject to any restrictions due to the protection of intellectual property, security rules or legitimate interests. (Article 17 of the Model Grant Agreement).

Ensure open access (free of charge, online access for any user) to peer-reviewed scientific publications relating to their results (Article 17 of the Model Grant Agreement).

Use their best efforts to exploit their results — up to four years after the end of the project – directly or to have them exploited indirectly by another entity, through transfer or licensing. (Article 16 of the Model Grant Agreement).

Results: "any tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature, whether or not they can be protected".

Acknowledge EU funding in all communication, dissemination, and exploitation activities (including IPR protection and standards) as well as on all equipment, infrastructure and major results financed by the action by using the wording and criteria specified in the Grant Agreement (Articles 17.2, 17.3).

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or [name of the granting authority]. Neither the European Union nor the granting authority can be held responsible for them

Figure 1: NEUROPULS statement to acknowledge EU funding

4. Dissemination and communication strategy

Communication, dissemination, and further exploitation must be addressed through an integrated approach that strategically plans activities to avoid ad-hoc efforts.

For that, clear objectives, defined targets, relevant messages, right media and means must be identified and implemented.

Communication, dissemination, and exploitation activities are closely linked: although they can be considered separately, they often belong together since one drives the other and vice versa. What differentiates them from another are the objectives, focus and target groups they address.

To build this integrated and strategic approach, the following steps must be implemented:

- Identification of the main objectives of the communication-dissemination-exploitation strategy and of the relevant target audiences;
- Definition of clear messages in accordance with the project objectives;
- Identification of proper communication means and tools;
- Formalization of the activity roadmap planning
- Description of the project key exploitable results and knowledge, their exploitation route and IP management.
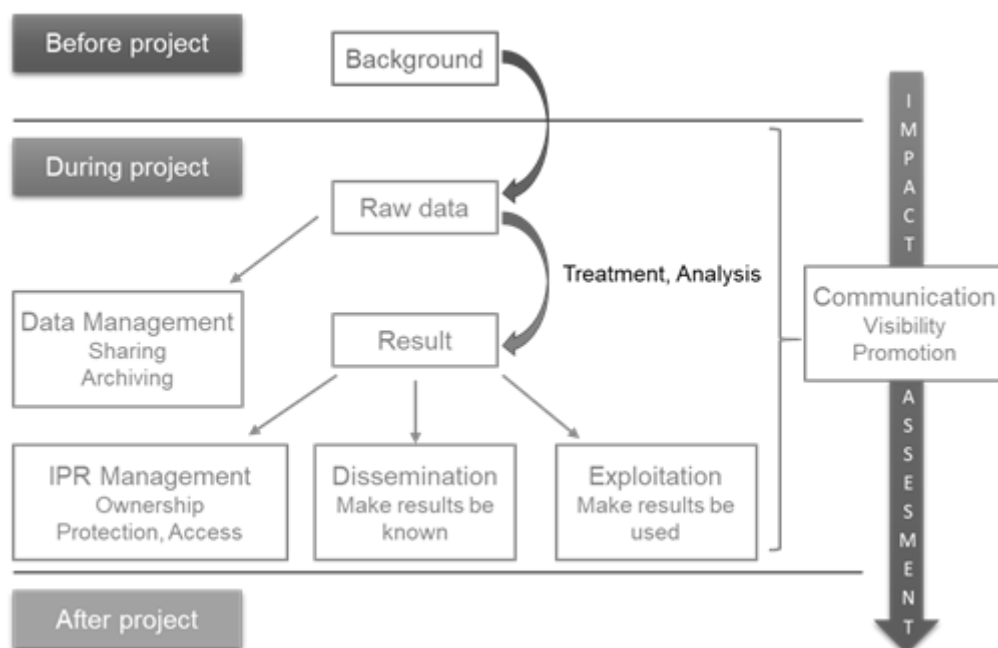

Figure 2: Processes involved in the valorization of the project and its results

4.1 Main objectives

- Make the project's work widely known / attract civil society attention
- Generate further research
- Generate interest to the project's results to ensure exploitation routes such as selling new products or providing new services
- Attract attendance at NEUROPULS stakeholder workshop in alignment with Task 7.2 about community building and Task 7.5 about workshops and summer schools.

4.2 Targeted audiences

The groups of target audiences of the project for communication, dissemination and exploitation purposes are shown in the picture below.
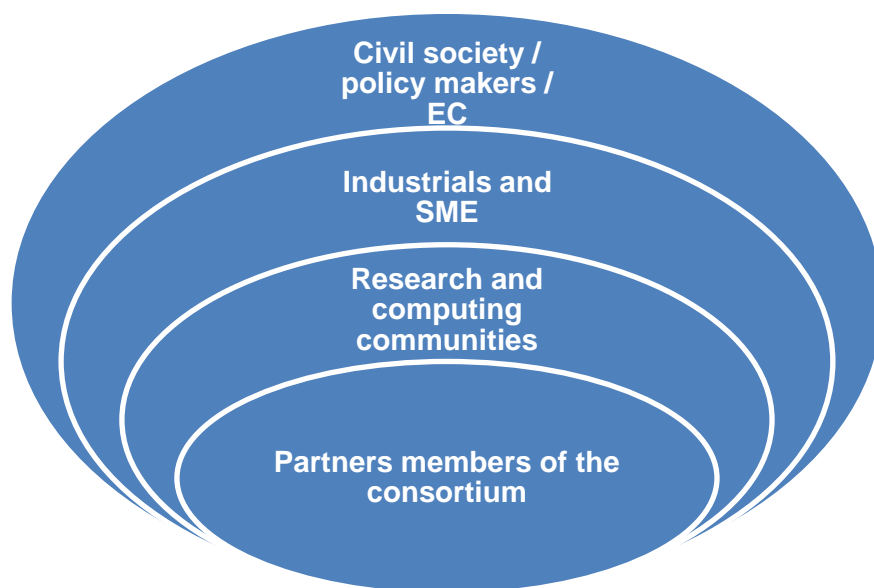

Figure 3: Scheme of targeted audiences of the NEUROPULS project

4.2.1 Members of the consortium

- RTOs, SMEs, Academic institutions, Industrials
- Highly involved in the project
- Expect to create/improve and transfer specific methods and results
- Get information through scientific events and papers
- Shall establish links with other R&I activities (see Table 2 below)

Table 1:Links to other R&I initiatives

Acronym / Program	Period	Title	Link with the project	Partners involved
GATEPOST	2023-2026	Graphene-based All Optical Technology Platform for Secure Internet of Things	Photonic neuromorphic computing using SiN/Graphene	HPE
SPIKEPro	2024-	SPIKING PHOTONIC-	Photonic neuromorphic	HPE

	2028	ELECTRONIC IC FOR QUICK AND EFFICIENT PROCESSING.	computing using spiking neurons in IIIV and RTDs	
Q-ONE	2023-2027	Q-ONE – Quantum Optical Networks based on Exciton-polaritons	Photonic neuromorphic computing based on exciton-polaritons	HPE
NEOTERIC	2020-2024	NEUROMORPHIC RECONFIGURABLE INTEGRATED PHOTONIC CIRCUITS AS ARTIFICIAL IMAGE PROCESSOR	Photonic accelerators	CEA GHENT
PROMETHEUS	2023-2026	PROgraMmable integrated photonic nEuromorphic and quanTum networks for High-speed imaging, communications and sEcUrity applicationS	Photonic Accelerators, Neural networks	CEA GHENT
NIMBLEAI	2022-2025	ULTRA-ENERGY EFFICIENT AND SECURE NEUROMORPHIC SENSING AND PROCESSING AT THE ENDPOINT	neuromorphic sensing & processing 3D integrated chip	BSC, POLITO
PARALIA	2023-2026	Radar and lidar technologies combine to deliver multi-beam platform	Chip to chip coupling	ARGOTECH
DYNAMOS	2022-2026	Dynamic and reconfigurable data centre networks with modular optical subsystems	Chip to chip coupling	ARGOTECH
PHASEPUF	2020-2025	Photonic Augmented Security via Physical Unclonable Functions	Security primitives	CNRS
Smartitude	2023-2025	Smartitude: Automated Testing and Security Assessment of Smart Contracts	Security of software components	UNIVR
iNest	2022-2025	Interconnected Nord-Est Innovation Ecosystem	IoT sensors (for smart digital agriculture)	UNIVR

4.2.2 Research communities

- Academics
- Neuromorphic computing and photonics sub-communities
- Main applications fields: edge computing, artificial intelligence, machine learning, sensors and IoT Devices, telecommunications
- Expect to build new collaborative research
- Get information through scientific events and papers
- Disseminate information through professional social media

4.2.3 Industrials and SMEs

- Industrials and SME in the sector of information technology, industry 4.0, and computing
- Expect to get feedback about project outcomes
- Expect to develop synergies with academics to foster new products and services creation, to meet new markets
- Get information through professional social media, professional events

4.2.4 Civil society / policy makers / European Commission

- Expect to get information about main project outcomes, and especially about their possible concrete applications
- Get information through mass media, social media, websites.

4.3 Dissemination and Communication plan - Key messages

This section presents the key messages towards the different target audiences, ensuring coherence between communication, dissemination, and further exploitation activities. To evaluate the quality of the communication, dissemination and exploitation actions, a set of KPIs and target values have been provided.

This section presents the key messages towards the different target audiences, ensuring coherence between communication, dissemination, and further exploitation activities. To evaluate the quality of the communication, dissemination and exploitation actions, a set of KPIs and target values have been provided.

Table 2: NEUROPULS Key messages

Target audience / stakeholder	Audience / stakeholder description	Objective	Message	Dissemination channels / platforms	KPIs for measuring the effectiveness of the approach and minimum target value	Result expected
Research community	Researchers & engineers specialized in neuromorphic computing, hardware security, photonics, and computer systems.	To establish links with related on-going research initiatives To build new collaborative research activities	The NEUROPULS project offers unparalleled opportunities for researchers to elevate their research, engage in high-impact collaborations, and access cutting-edge training.	International conferences Workshops Peer-reviewed scientific journals	10 participations 2 training sessions organized 15 publications	Enhanced transfer and adoption of results, design of new collaborative research proposals, stimulation of new research collaborations, and extensive training opportunities for students.
Computing community	Computing researchers, practitioners, and educators focused on advanced computing technologies.	To facilitate transfer and adoption of results, To design new collaborative research proposals, To stimulate new research collaboration and train students.	Explore the forefront of computing innovations with NEUROPULS, fostering new scientific knowledge and collaborations in advanced computing research.	1 Workshop 2 brokerage events Targeted newsletters	15+ novel industry partnerships generated 4 seminars conducted a measurable increase in collaborative research proposals.	Better acceptance and adoption of NEUROPULS results within the computing community, leading to innovative projects and advancements.

Industrials including SMEs	Industry actors in the sectors of edge computing, photonics, AI & ML, telecommunications.	To match the project new material and corresponding research advances with market opportunities	Leverage NEUROPULS's groundbreaking advancements for your business to unlock new market potentials and technological frontiers.	Social networks Demonstration Workshop Brokerage events	100 new followers per year in social networks 5 letters of interest to join the project Advisory Board	Active feedback during workshop activities, increased acceptance of the technologies developed, and adoption by potential industrial users.
Other stakeholders	Civil society; Public agencies; Policy makers	Develop synergies to foster commonly accepted solutions	Discover how NEUROPULS's innovations contribute to societal advancements and are shaping the future of technology.	NEUROPULS Website NEUROPULS social media (LinkedIn & "X")	Number of visits: 500+ 48 updates At least 400 followers ; 48 updates	Attract attention and generate widespread interest, promoting NEUROPULS's achievements and fostering a positive public perception and acceptance.

4.4 Best practices while implementing Communication and Dissemination activities

- **Website, social media and communication in general**

On a monthly basis: The partners are encouraged to send new contents: information, results, pictures or any relevant material to be published on the Website and Social Networks.

Before each consortium meeting: The partners are requested to fill in a monitoring tool in order to track past and future communication and dissemination activities.

- **Events to be organized by the partners**

2 months before the event:

· The partners are asked to create the event flyer/schedule/registration form and to promote the event on their organization website.

· An announcement about the event is published on the NEUROPULS Website and the Social Media.

1 month before the event:

· The same announcement about the event is published again on the Social Media.

1 week before the event:

· A final reminder about the event is published on the Social Media.

· The partners organizing the event are reminded to take pictures during the event.

During the event:

• The organizing partners' communication departments are encouraged to facilitate uptakes of the events (photos, articles, and interviews) to promote the NEUROPULS project on their own websites.

• A reference to these materials is made on the NEUROPULS website and the Social Media

Within one month after the event:

• The organizing partners are asked to send contents of the event to be published on the Website and the Social Media.

- **International events to be attended by the partners**

2 months before the event:

• The partners are asked if they intend to participate to events

• The partners are reminded to promote the NEUROPULS project (using promotion tools such as the flyer, poster) and its outcomes (during lectures and specific poster sessions).

On the month of the event:

• The news about the participation of the NEUROPULS project partner(s) to the event is published in the Website and the Social Media,

• The partner(s) is/are reminded to take pictures at the event

Within one month after the event:

• The partner(s) is/are asked to send contents such as photos or any other materials) and reports on the participation to the event on the Website and the Social Media.

5. Dissemination and Communication activities

5.1 Dissemination and Communication tools

5.1.1 Visual identity, logo, flyer, roll-up banner, templates

The NEUROPULS visual identity including the logo were designed and created at the beginning of the project, and is described in the deliverable D7.1 Visual identity, project website and social network account submitted in May 2023.

During the first year of the project templates (WORD, PPT) were produced for project meeting presentations and deliverables.

Figure 4: NEUROPULS template deliverable

Figure 5: NEUROPULS template presentation

A general leaflet introducing the project was designed and created in the last months of the first reporting period.

Figure 6: NEUROPULS General Flyer

5.1.2 Project website

The NEUROPULS website is a key tool for external one-way communication. It was launched at month 2 (February 2023) and is continuously fed to keep the audience informed and ensure interest of already attracted visitors.

Indicators related to the website activities are regularly checked. They include for example the following criteria: number of sessions, number of users and new users, average session duration, number of documents downloaded, geographical distribution of the users.

More information is available in the deliverable 7.1.
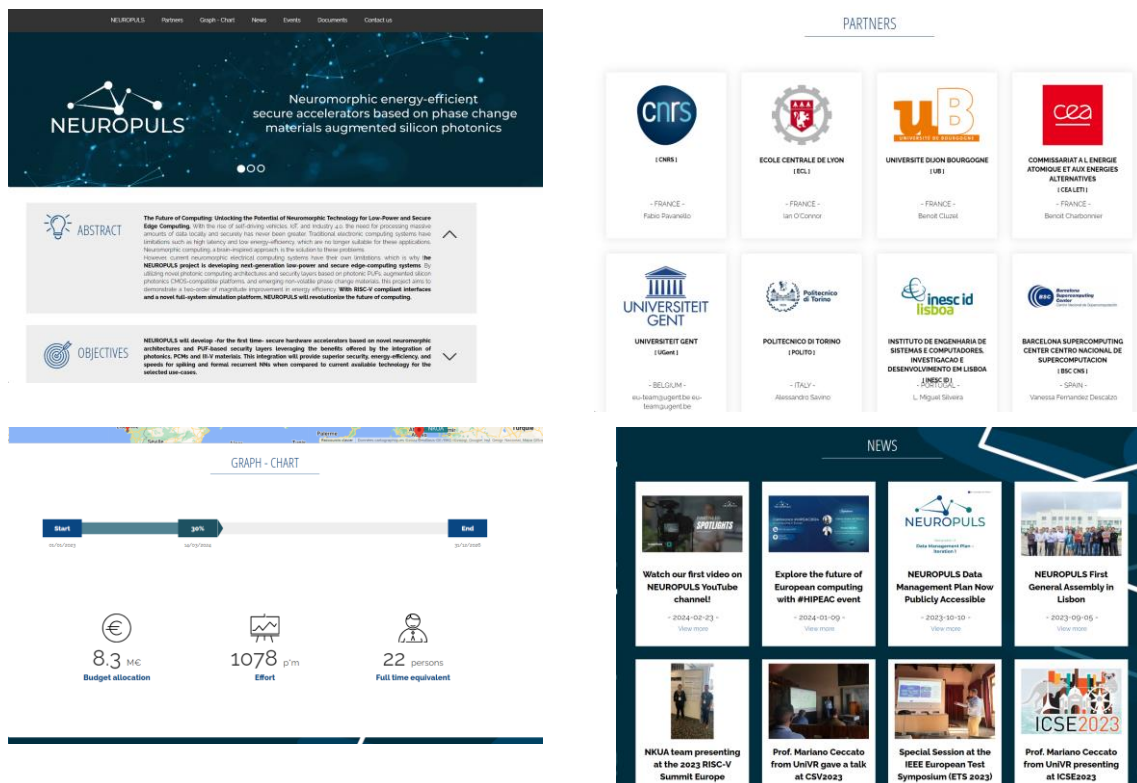
Figure 7: NEUROPULS project website

5.1.3 Reference to the project on each partner's website

To optimize the communication on the project, all partners have been encouraged (at least academic ones in this project) to refer to the NEUROPULS network on their own websites at the beginning of the project.

Table 3: Reference to the project on each partner's website

Partner	Website URL	Mention of the NEUROPULS Project
P01 CNRS	https://croma.grenoble-inp.fr/fr/recherche/projets-de-recherche	YES
P02 CEA	www.leti-cea.fr	NO
P03 UGENT	photonics.intec.ugent.be	NO
P04 POLITO	www.smilies.polito.it	YES
P05 INESC ID	https://www.inesc-id.pt/projects/	YES
P06 BSC	www.bsc.es	YES
P07 HPE	www.hpe.com/us/en/hewlett-packard-labs.html	NO
P08 ALBORA	www.albora.io	NO
P09 NKUA	cal.di.uoa.gr	YES
P11 ARGOTECH	www.argotech.cz	YES
P12 UNIVR	https://www.univr.it/home	NO
P13 TUB.	https://www.tu.berlin/	NO

5.1.4 NEUROPULS Social Media

The NEUROPULS Social Media, "X" and LinkedIn, are key tools for external one-way communication. They were launched at month 2 (February 2023) and are continuously fed to keep the audience informed and ensure interest of already attracted visitors.

More information is available in the deliverable 7.1

To optimize the communication on the project, all partners have been encouraged to make reference to the NEUROPULS network from their own social media at the beginning of the project.

5.1.4.1 "X"

https://twitter.com/neuropuls

The NEUROPULS "X" account is used to serve communication, dissemination and exploitation objectives: announcements, short comments, or news may be posted, if possible, with media attachments (photos, images, videos …).

The "X" account can be fed continuously, which requires involvement of all partners to send regularly contents and material to the WP7 leader.

KPIs related to "X" are regularly checked. They include for example the following criteria: number of posts, number of followers, number of profile visits, number of impressions and engagements.
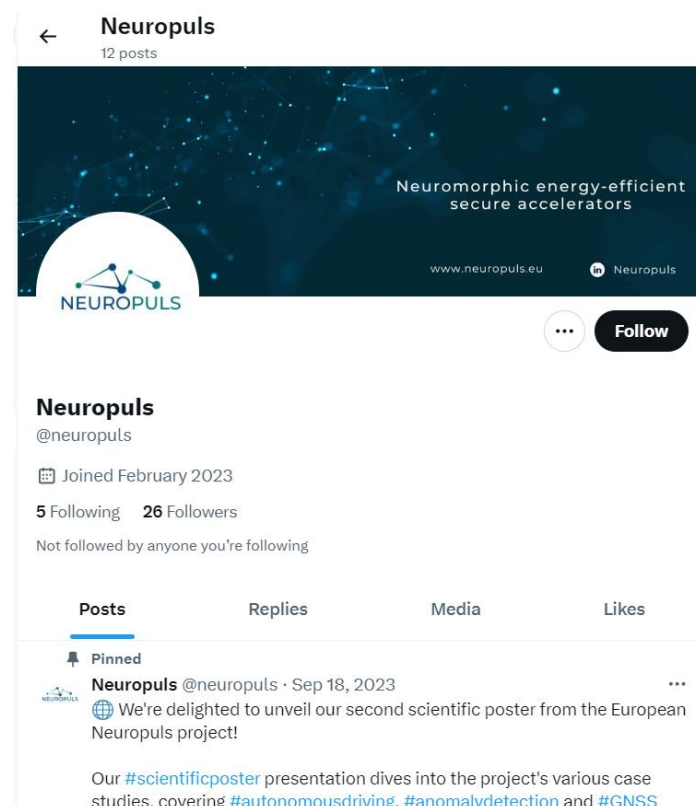
Figure 8: NEUROPULS "X" profile

5.1.4.2   LinkedIn

A LinkedIn public page was created during the first reporting period, in February 2023 to share news and updates about the NEUROPULS project, as well as to provide information about the project's goals, objectives, and impact.

https://www.linkedin.com/company/neuropuls/
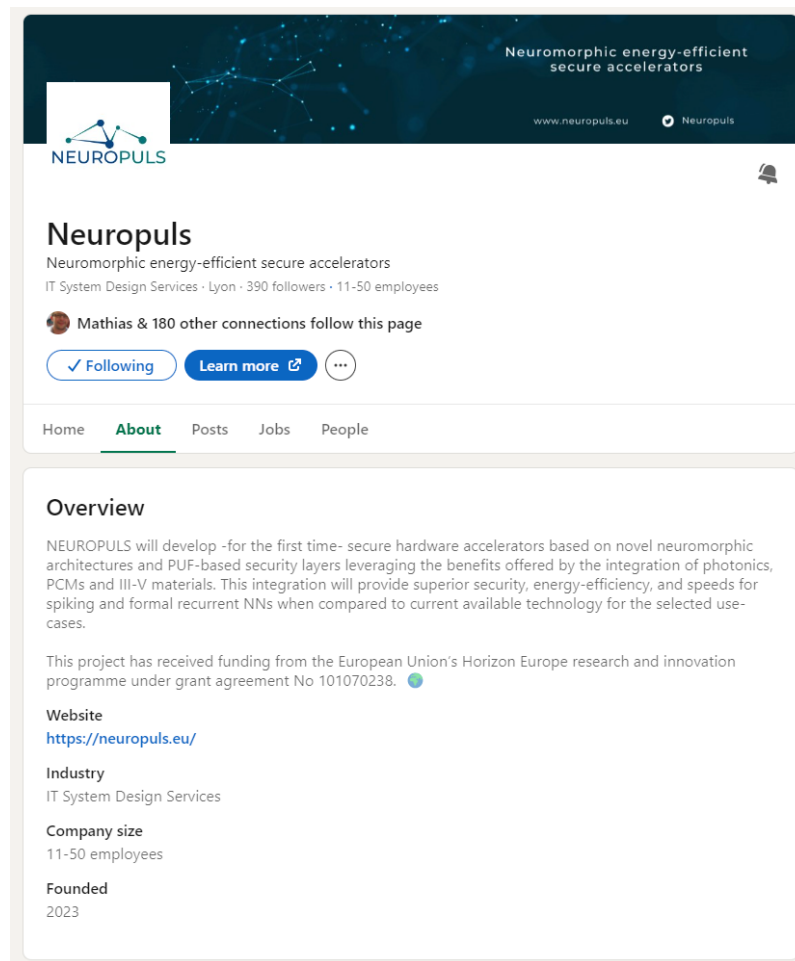
Figure 9: New NEUROPULS LinkedIn profile

The specific KPIs tracked from NEUROPULS LinkedIn page are:

- Number of articles/posts
- Number of followers :
- Number of views,
- Number of likes.

5.1.4.3   YouTube

A NEUROPULS YouTube channel was created in February 2024.

The specific KPIs tracked from NEUROPULS YouTube channel are:

- Number of subscribers
- Number of views

5.1.4.4   Electronic social media and Interviews

The NEUROPULS consortium will make use of official EU services and "instruments" of publicity to promote the main project achievements:

- "Top stories" publication in Horizon results;
- Interviews at EU Horizon Magazine (horizon-magazine.eu),
- ZENODO - an open access repository for all fields of science which is recommended by the Open Access Infrastructure for Research in Europe (OpenAIRE) – will be used to publicize the project outputs such as conference proceedings, presentations and publications.

5.1.5   Videos

Three videos are planned during the life of the project:

- A first video introducing the project's goals;
- A second one presenting the results achieved by the project;
- A third video, presenting the project's achievements.

The first video has been filmed during the project General Assembly held in September 2023 in Lisbon. The partners have been interviewed to present their roles and objectives in the project.

D7.2 Update on the dissemination and communication plan : iteration 1 – Public 24

Figure 10: screenshots of the first NEUROPULS video

This has resulted in the production of the first project video, available on the social networks, website, and YouTube channel.

5.2 Dissemination and Communication means

5.2.1 Events

The organisation and participation to events is an important measure to ensure up-take and exploitation of the NEUROPULS project results, as well as achieve the communication and dissemination objectives. Possible synergies with other consortia will be considered as much as possible in order to increase readiness awareness of the NEUROPULS technologies and get feedback from experts in the community that may help eventually to build a consolidated and complementary vision for EU computing sector.

5.2.2 Events to be organized by the project consortium

Seminars, workshops, demonstration workshops, brokerage events

The NEUROPULS project is committed to organise several events:

- Project General Assemblies with associated networking events each 6 months:
    - January 2023, Ecully, France, all members
    - September 2023, Lisbon, Portugal, all members
    - March 2024, Barcelona, Spain, all members (Review Meeting)
    - December 2024, Canazei, Italiy, all members
    - June 2025, TBD, all members (EAB workshop with IoT/edge-devices community students/postdocs)
    - December 2025, TBD, all members
    - June 2026, TBD, all members (EAB workshop with IoT/edge-devices community students/postdocs)
    - December 2026, TBD, all members

5.2.3 Participation to international events

To promote the NEUROPULS project and its results, and make them widely known, the participation to international events such as conferences, congresses and symposia are important points to serve communication, dissemination and exploitation objectives.

Below is a non-exhaustive list of events where NEUROPULS partners could promote the project and disseminate its results.

Dedicated to scientific community and industry

Event Type – Title - URL	Audience (Cat., size)	Place and date	Involved partner (contribution, materials)
SPIE Photonics Europe 2024	Researchers, engineers in photonics (Medium to large size)	9 th-10 th of April 2024	ARGOTECH (Contribution: Demonstration of photonic computing architectures, Materials: Technical posters, demo units)
OPTATEC 2024	Industry professionals in optical technologies (Medium size)	14 th -16 th of May 2024	ARGOTECH (Contribution: Presentation on advancements in optical components for neuromorphic systems, Materials: Brochures, case studies)
Optics and Photonics in Finland	Nordic photonics community, academics, and industry (Small to medium size)	28 th -30 th of May 2024	ARGOTECH (Contribution: Workshop on leveraging photonics in neuromorphic computing, Materials: Slide decks, white papers…)
Sensor Test 2024	Sensors and measurement community,	11th - 13th of June 2024	ARGOTECH (Contribution: Exhibition on sensor

	industry, researchers (Medium size)		technologies integrated with neuromorphic computing, Materials: Product samples, technical specifications)
DAC2024 (Design Automation Conference)	Electronic / Photonic community, both academic and industrial (Large size)	23-27th June, 2024	(Contribution: Joint presentation on the integration of photonic systems in neuromorphic computing, Materials: Research papers, prototype demonstrations)

Dedicated to General Public

- European Researchers' Night, simultaneously in several EU countries near September
- Science Festivals of various locations: annual festival of Science in Lyon, Edinburgh International Science Festival, Genoa Science Festival…
- Public lectures and open days at universities.

5.2.4 Other means to disseminate and communicate about NEUROPULS Project

Type	Title	URL
Online service	Digital innovation hub for photonics	https://www.photonhub.eu/
Online Repository	GitHub for NEUROPULS Open Source Software	Currently closed to project members
Online Journal	TBD - TechCrunch Article Feature on NEUROPULS	https://techcrunch.com/

Professional Network	TBD - NEUROPULS Webinar Series on BrightTALK	https://www.brighttalk.com/
Research Network	ResearchGate Project Page for NEUROPULS	https://www.researchgate.net/
Newspaper article in HIPEAC	Topic concerning cybersecurity – interview scheduled	Not yet available

An updated general roadmap of the communication-dissemination activities is to be found in Annex 1 to this deliverable.

6. Monitoring and assessment of the Dissemination, Communication activities

6.1 Main Dissemination and Communication activities to date

6.1.1 Website and Social Media

This section presents an update of the statistical data from the project website and the social media selected for the project ("X" and LinkedIn). This analysis covers the period from January 1st 2023 to February 29th 2024.

Website frequentation and returning visitors - period covering 01-01-2023 – 29-02-2024

At the end of the period, the website frequentation reached a total of 1,3k users, with an average of 92 users per month. 99% of the users were new visitors. During this period, 11 news were published on the website.

Figure 11: Website frequentation – 01-01-2023 – 29-02-2024

Website KPI achievements

KPI achievements are measured (in aggregate) against the target indicated under section 4.3.

KPI - Website	Target value	Actual M14
Nber of visits to the website	400	1300
Website update	48	11

Website Traffic acquisition – period covering 01-01-2023 – 29-02-2024

As shown in Figure 12; the main traffic sources were "Direct" - 819 users - (mostly when traffic is generated by a direct URL entry of the website) and "Organic Search" – 333 users- (traffic that comes from natural results from search engines recognised by Google (Google, Bing, Yahoo…). The next traffic source was "Organic social" – 51 users - (traffic to the website generated by any social media activity without a paid promotion. It uses free social media tools to build and engage with an online

following). This was followed by "Referral"- 87 users - (traffic to the website generated through referral sites (excluding social networks). The last traffic source "Unassigned" – 36 users.
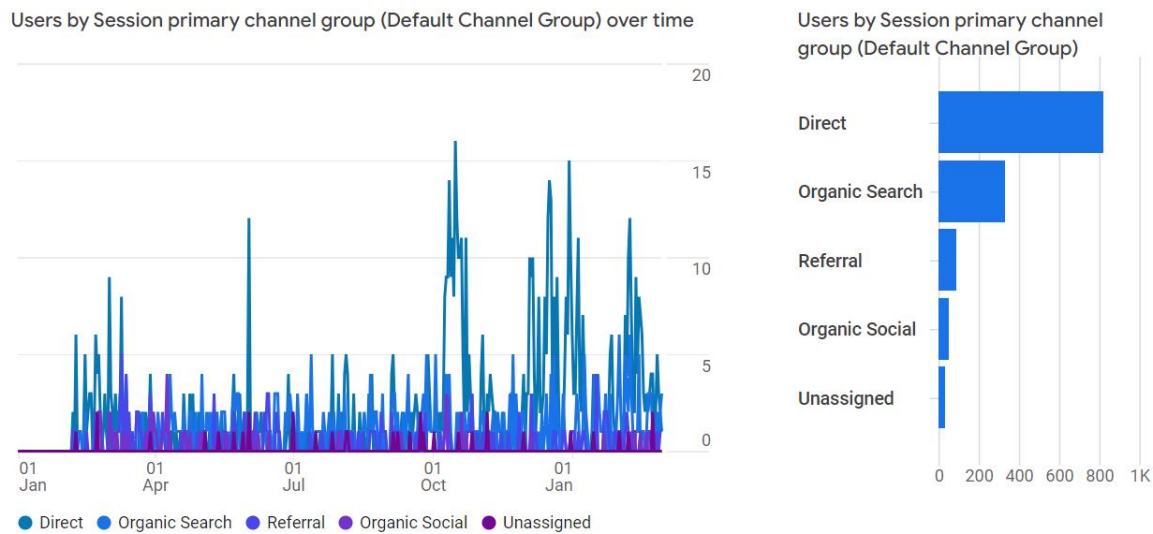
Figure 12: Number of sessions per traffic source – 01-01-2023 – 29-02-2024

Figure 13 shows that over the period stretching from xx-xx-xxxx to xx-xx-xxxx, most visitors to the website were from United States (491) followed by France (182) and China (77). This suggests the global impact the NEUROPULS project has had, and its website has been visited by people from all over the world.

In Europe, we could observe that - after France – most of the website visitors were from EU countries where the NEUROPULS partners are located: Italy (67); Spain (52); Portugal (48).

Users▾ by Country
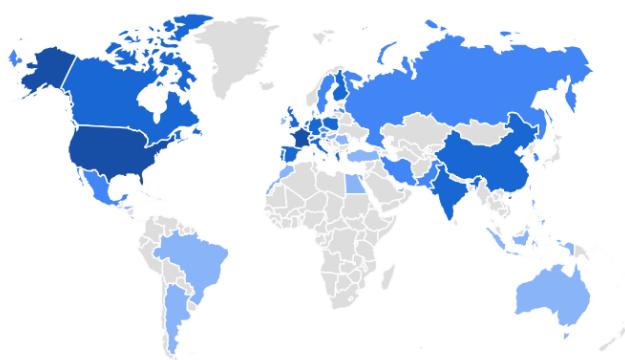
COUNTRY	USERS
United States	491
France	182
China	77
Canada	75
Italy	67
Spain	52
Portugal	48

Figure 13: Website visitor's geographical distribution – 01-01-2023 – 29-02-2024

YouTube

In the period stretching from 01-01-2023 – 29-02-2024, 1 video was published and generated in total 26 views. It has been published also on LinkedIn, explaining the minimal amount of views directly on YouTube.

Social Media - **period covering 01-01-2023 – 29-02-2024**

"X"

In the period stretching from 01-01-2023 – 29-02-2024, the following results were obtained:

- Number of tweets: 12
- Number of re-tweets from project partners professional "X" accounts: 8
- Number of followers: 26
- Number of impressions: 1132
- Number of likes: 23

LinkedIn

In the period stretching from 01-01-2023 – 29-02-2024, the following results were obtained:

- Number of articles/posts: 38
- Number of followers: 342
- Number of views: 21 955
- Number of likes: 604

Current numbers updated on 29-03-2024 indicate that we have reached the dissemination KPI linked to number of followers with 400 expected at the end of the project and 416 achieved (390 Linkedin and 26 "X").

6.1.2   Scientific publications

In the first and second reporting periods, the NEUROPULS partners published 10 papers of which: 1 article in journals, 9 publications in conference proceedings/workshops. Out of the 10 publications, 9 were in Green open access and 1 in Gold open access.

Type	Title	Year of publication	Authors	DOI or Link	Green or Gold Open Access
Publication in conference proceeding/Workshop	Automated Black-box Testing of Mass Assignment Vulnerabilities in RESTful APIs	2023	Corradini, Davide; PASQUA, MICHELE; Ceccato, Mariano	[10.1109/ICSE48619.2023.00213](#)	Green
Publication in conference proceeding/Workshop	Photonic Physical Unclonable Function Based on Symmetric Microring Resonator Arrays	2023	Jimenez, Paul; Cardoso, Raphael; Gomes de Queiroz, Mauricio; Abdalla, Mohab; Zrounba, Clément; Letartre, Xavier; Marchand, Cédric; Ruhrmair, Ulrich; Pavanello, Fabio	[10.5281/zenodo.8436663](#)	Green
Publication in conference proceeding/Workshop	NEUROPULS: NEUROmorphic energy-efficient secure accelerators based on Phase change materials aUgmented siLicon photonicS	2023	Fabio Pavanello; Cedric Marchand; Ian O'Connor; Régis Orobtchouk; Fabien Mandorlo; Xavier Letartre; Sebastien Cueff; Elena Ioana Vatajelu; Giorgio Di Natale; et al.	[10.1109/ets56758.2023.10173974](#)	Green
Publication in confere	Remote Attestation of IoT Devices using	2023	Marastoni, Niccolò; Ceccato, Mariano	[10.1145/3605758.3623502](#)	Green

nce proceeding/Workshop	Physically Unclonable Functions: Recent Advancements and Open Research Challenges				
Publication in conference proceeding/Workshop	Special Session: Neuromorphic hardware design and reliability from traditional CMOS to emerging technologies	2023	Fabio Pavanello; Elena Ioana Vatajelu; Alberto Bosio; Thomas Van Vaerenbergh; Peter Bienstman; Benoit Charbonnier; Alessio Carpegna; Stefano Di Carlo; Alessandro Savino	[10.1109/vts56346.2023.10139932](#)	Green
Publication in conference proceeding/Workshop	Enabling Design Space Exploration of RISC-V Accelerator-rich Computing Systems on gem5	2023	Odysseas Chatzopoulos; George Papadimitriou; Vasileios Karakostas; Dimitris Gizopoulos	[Link](#)	Green
Publication in conference proceeding/Workshop	Silent Data Errors: Sources, Detection, and Modeling	2023	Singh, Adit; Chakravarty, Sreejit; Papadimitriou, George; Gizopoulos, Dimitris	[10.1109/VTS56346.2023.10139970](#)	Green
Article in journal	Silent Data Corruptions: Microarchitectural Perspectives	2023	Papadimitriou, George; Gizopoulos, Dimitris	[10.1109/TC.2023.3285094](#)	Gold
Publication in conference proceeding/Workshop	Energy Efficiency of Out-of-Order CPUs: Comparative Study and Microarchitectural Hotspot Characterization of RISC-V Designs	2023	Chatzopoulos, Odysseas; Papadimitriou, George; Wong, Wing Shek; Gizopoulos, Dimitris	[10.1109/IISWC59245.2023.00032](#)	Green

Publication in conference proceeding/Workshop	Estimating the Failures and Silent Errors Rates of CPUs Across ISAs and Microarchitectures	2023	Gizopoulos, Dimitris; Papadimitriou, George; Chatzopoulos, Odysseas	10.1109/ITC51656.2023.00056	Green

KPI Achievements

KPI achievements are measured (in aggregate) against the target indicated under chapter 4.

KPI's	Target	Achieved at M14
Number of publications in international journal	15 publications in international journal	10 publications in international journals

Scientific papers under preparation or consideration- at project month 14.

Type	Title	Authors	Green or Gold Open Access	WP
paper	Modelling of the new architectures	UGent, HPE, Torino	TBD	4
paper	Remove authentication using hardware security primitives	UniVR, INESC-ID	TBD	5
paper	Remote software attestation using hardware security primitives	UniVR	TBD	5
paper	Roadmap paper on memory for photonic neuromorphic computing (in preparation)	CNRS, HPE, CEA, UGENT	TBD	3, 4
paper	Neuromorphic architectures based on augmented silicon	CNRS, HPE, CEA, UGENT,	TBD	3,4

	photonics platforms (submitted)			
paper	Complexity Assessment of Analog Security Primitives Using the Disentropy of Autocorrelation (submitted)	CNRS	TBD	4
paper	Security layers and related services within the Horizon Europe NEUROPULS project	CNRS, NKUA, POLITO, INESC-ID	TBD	4,5

6.1.3 Events organized by the project consortium

Table 4: List of organized events

When	Title	Where	Participants
2023_01_26-27	Project Kick-off	Ecully	All members
2023_09_04-05	Project general assembly	Lisbon	All members
2024_03_21-22	Project general assembly and Review	Barcelona	All members
2024_12_12-13	Project general assembly	Canazei	All members
2025_06	Project general assembly and Workshop on	TBD	All members + EAB + IoT / edge-devices community – students/postdocs
2025_12	Project general assembly	TBD	All members
2026_06	Project general assembly and Workshop on	TBD	All members + EAB + IoT / edge-devices community Industrials including SMEs – students/postdocs

2026_12	Project general assembly	TBD	All members

6.1.4 Participation to events

In the period stretching from 01-01-2023 – 29-02-2024, 4 national and international events (Congresses, Seminars, Departmental Seminars, Schools, Symposia, Workshops, Conferences, Online Conferences, Meetings, Anniversary Event) were visited by NEUROPULS consortium members.

Table 5: List of events visited by NEUROPULS consortium members

Event Type – Title - URL	Audience (Cat., size)	Place and date	Involved partner (contribution, materials)
Conference - IEEE VTS 2023	Academic and industry professionals in vehicular technology (Medium to large size)	April 24-26, 2023	CNRS (Contribution: Special session on neuromorphic accelerators in collaboration with the VITAMIN V project, Materials: Presentations, research papers)
Conference - IEEE ETS 2023	Electronics testing and semiconductor industry, researchers (Medium size)	May 22-26 in Venice, Italy	CNRS (Contribution: Joint session with VITAMIN V and CONVOLVE projects, focusing on the project at large, Materials: Technical discussions, collaborative research findings)
Conference - IEEE DAC 2024	Design automation community, both academic and industrial (Large size)	June 27, 2024	CNRS (Contribution: Joint session with NIMBLE AI, CONVOLVE, NEUROSOC projects from the same call as NEUROPULS, focusing on neuromorphic accelerators, Materials: Cross-project insights, technological advancements)
Conference - DATE 2024	Design, automation, and test in electronics, researchers, industry professionals (Large	March 25, 2024	Multi-partners (Contribution: Participation discussing security aspects in NEUROPULS, Materials: Security-focused presentations, white papers)

	size)		

7. Conclusion

The activities related to communication and dissemination have started to be deployed in the years 2023 and 2024.

The KPI achievements showed significant results with respect to dissemination (publications) and the achievements made during the period are therefore aligned with the strategy to be carried out as well as all means and material designed and produced for increasing the awareness of the NEUROPULS project.

This first iteration covers the second and third years of the project, starting from 1st January 2024 till 31 March 2024. The current status of the different achievements towards the objectives and measurable indicators are reported, thus giving the progress of the communication, dissemination activities, and outlining the work to be done in the next months of the project.

This deliverable will continue to be updated in the course of the project.

ANNEX 1 - General roadmap of the communication-dissemination activities

Table 6: NEUROPULS Communication and Dissemination Roadmap

Action	Date/Frequency	Objective	Target audience	Mean	Lead Partner	Results expected
YEAR 1 - 2023						
Launch NEUROPULS Website and Social Media	February 2023	Introduce the project and its goals, provide updates and news	General public, academia, industry	Website, Twitter, LinkedIn	CNRS	Attract visitors and followers, establish online presence
Project Kick-off Meeting in Ecully (FR)	26-27 January 2023	Officially start the project, set goals and expectations	Consortium members	Event	CNRS	Consortium alignment, shared understanding of project objectives
Publish and distribute NEUROPULS General Flyer	First reporting period	Spread awareness and understanding of the project's aims	General public, academia, industry, potential collaborators	Print and digital distribution	CNRS	Broader recognition and interest in the NEUROPULS project
Quarterly NEUROPULS News Publications	Quarterly throughout 2023	Keep the research community and the public	Research community, general public	Website updates	CNRS	Ongoing engagement and information dissemination

		informed of progress				
Participation in IEEE VTS 2023	24-26 April 2023	Disseminate research findings, engage with academic and industry experts	Academic and industry professionals in vehicular technology	Conference	CNRS	Enhanced academic and industry collaboration and visibility
Participation in IEEE ETS 2023	22-26 May 2023	Foster collaboration across EU projects, showcase project advancements	Electronics testing and semiconductor industry, researchers	Conference	CNRS	Inter-project engagement, increased research collaboration
Produce First NEUROPULS Video	September 2023	Introduce project's goals and interview partners	General public, academia, industry	Video, shared on social media	CNRS	High engagement on social media, increased project visibility
Project General Assembly in Lisbon (PT)	September 2023	Update on project status and plan next steps	Consortium members	Event	CNRS	Consortium progress update, strengthened collaboration

YEAR 2 - 2024						
International events where NEUROPULS project could be promoted in 2024						
Participation in SPIE Photonics Europe 2024	9th-10th April 2024	Demonstrate the NEUROPULS project's photonic computing advancements	Researchers, engineers in photonics	Conference, demonstrations	ARGO TECH	Increased academic and industry engagement, showcase technological capabilities
Participation in OPTATEC 2024	14th-16th May 2024	Present advancements in optical components	Industry professionals in optical technologies	Conference, presentations	ARGO TECH	Networking with industry professionals, generate

		for neuromorphic systems				potential industrial interest
Participation in Optics & Photonics in Finland	28th-30th May 2024	Workshop on leveraging photonics in neuromorphic computing	Nordic photonics community, academics, and industry	Workshop	ARGO TECH	Enhanced understanding of NEUROPULS technologies, foster Nordic collaboration
Participation in Sensor + Test 2024	11th-13th June 2024	Exhibit sensor technologies integrated with neuromorphic computing	Sensors and measurement community, industry, researchers	Exhibition	ARGO TECH	Product awareness, user feedback, industry partnerships
Participation in DAC 2024	23rd-27th June 2024	Joint presentation on photonic systems in neuromorphic computing	Electronic / Photonic community, both academic and industrial	Conference	CNRS	Share insights, highlight cross-project developments, technological sharing
Consortium events considered for 2024						
Project General Assembly and Review	March 2024	Consortium update and review meeting	Consortium members	Event	CNRS	Review project progress, strategic planning for the next phase
Project General Assembly in Canazei (IT)	December 2024	Annual update, set the stage for final year activities	Consortium members	Event	CNRS	Align consortium, refine goals and objectives for final project year
YEAR 3 - 2025						
International events where NEUROPULS project could be promoted in 2025						
Participation in European	September 2025 (annual)	Public engagement and	General Public	Public event	CNRS	Public engagement and awareness,

Researchers' Night		awareness of research activities				attract potential collaborators
Participation in Science Festivals	Various dates in 2025	Outreach to the general public to disseminate project knowledge and results	General Public	Public festivals	CNRS	Increase public interest in science and technology, knowledge dissemination
Consortium events considered for 2025						
Project General Assembly and Workshop targeting IoT/edge-devices communities	June 2025	Engage with IoT/edge-device community, students, and postdocs	IoT / edge-devices community, Industrials, SMEs, academia	Workshop, networking event	CNRS	Strengthen collaboration with IoT/edge-device sector, gain insights from community
Project General Assembly	December 2025	Update on project status and plan next steps	Consortium members	Event	CNRS	Update on final year progress, planning for project closure and exploitation
International events where NEUROPULS project could be promoted in 2026 not yet considered						