plasmoni AC

Energy- and Size-efficient Ultra-fast Plasmonic Circuits for Neuromorphic Computing Architectures

Deliverable D7.2
1st Project Press Release

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*) PU = Public ;PP = Restricted to other programme participants (including the Commission Services) ; RE = Restricted to a group specified by the consortium (including the Commission Services) ; CO = Confidential, only for members of the consortium (including the Commission Services)

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Abstract

This report gives an overview of the content of the 1st PlasmoniAC press release, the link to it, as well as the expected reach it will have. Press release targets research and education community, private sector and general public.

Keywords

Media-kit, Press release

Dissemination Level :   Public

Dissemination Level :	Public

Table of Contents

Dissemination Level :   Public

List of Abbreviations

MAC	Multiply Accumulate

Dissemination Level :	Public

1 Executive Summary

This document presents information regarding the 1st PlasmoniAC project press release. It shows its content, the link where it can be found, as well as the webpage screenshot.

2 Introduction

2.1 Purpose of this document

The objective of this deliverable is to present the content of the 1st PlasmoniAC press release, the link to it, as well as the expected reach it will have. Press release targets research and education community, private sector and general public.

2.2 Document structure

The present deliverable is split into following major chapters:

- Content of the 1st project press release
- Targeted audience and means for increasing visibility
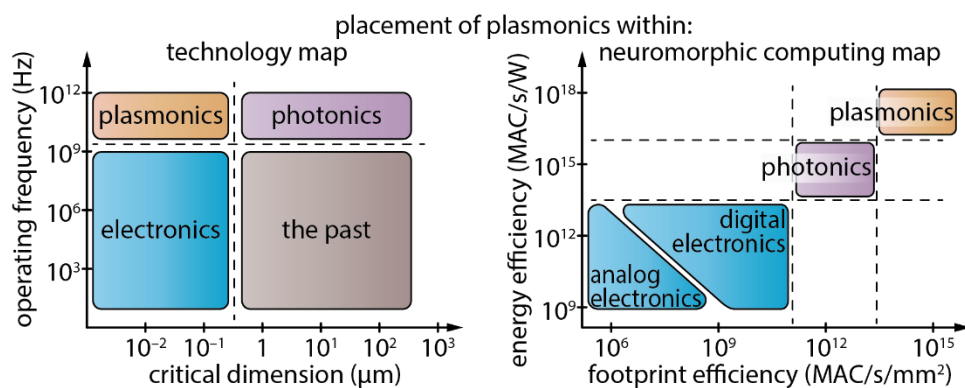
2.3 Audience

This document is public.

Dissemination Level :   Public

3 Content of the press release

A press release was generated in order to communicate the beginning of the project. It was announced at the VPI's website on March 2nd, 2020 and linked in the project official page. The content of the press release is as follows:

VPIphotonics contributes to PlasmoniAC

Turning plasmons into neurons to revolutionize the landscape of brain-inspired computing through EU-funded PlasmoniAC research project

PlasmoniAC – "Energy- and Size-Efficient Ultra-Fast Plasmonic Circuits for Neuromorphic Computing Architectures" – is a new 3-year long EU-funded project, with a budget of almost 4 Million € under the H2020-ICT-06-2019: Unconventional Nanoelectronics Call, launched on January 1st, 2020, aiming to release a whole new class of energy- and size-efficient feed-forward and recurrent artificial plasmonic neurons with **up to 100 GHz** clock frequencies and **1 and 6 orders of magnitude** better energy- and footprint-efficiencies, comparing to the current state-of-the art.

PlasmoniAC's **consortium** is strategically compiled from strong industrial and academic organizations which will work synergistically and complementary along the PlasmoniAC's value chain. Starting from material engineering and core fabrication technology providers through device and circuit manufacturers up to system testing suppliers and computing industry vendors PlasmoniAC's team includes: four distinguished universities, Aristotle University of Thessaloniki (GR), University of Southampton (UK), Swiss Federal Institute of Technology in Zurich (CH) and University of Burgundy - Franche-Comté (FR), two renowned international R&D centers, French National Center for Scientific Research (FR) and Interuniversity Microelectronics Centre IMEC (BE), the European research branch of one of the world's largest computing technology developer and supplier, IBM Research GmbH (CH), a dynamic SME with an excellent industrial and R&D track-record, AMO GmbH (DE), one of the world's largest capital equipment supplier and vendor in the area of DataCom components and systems, Mellanox Technologies Ltd (IL), and one of the leading photonic software design houses, VPIphotonics GmbH (DE).

VPIphotonics will develop an add-on model library of plasmonic devices for use in VPIphotonics Design Suite. The goal is for users to be able to build and simulate neuromorphic circuits and evaluate the performance of plasmonic-based deep neural network architectures.

Following a holistic hardware/software co-design approach, PlasmoniAC targets the following **objectives**:

   i)   to elevate plasmonics into a computationally-credible platform with Nx100 Gb/s bandwidth, µm²-scale size and >10^{14} MAC/s/W computational energy efficiency, using CMOS compatible electro- and thermo-optic computational functions,

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ii) to blend them via a powerful 3D co-integration platform employing photonic for interconnection, plasmonics for computations and non-volatile memristor-based control of the neuron weights,

iii) to fabricate and demonstrate a whole new class of plasmonic neurons for feed-forward and recurrent neural networks, applying them towards IT security-oriented applications, and

iv) to embrace them into a properly adapted Deep Learning training model suite, ultimately delivering a neuromorphic plasmonic software design library.

As a coordinator, Aristotle University of Thessaloniki hosted the **kick-off meeting** on January 21st-22nd, 2020 in Thessaloniki, Greece, gathering representatives of all partners in a highly inspiring atmosphere and announcing intensive collaboration within the network. With all members highly motivated, PlasmoniAC is now looking forward to the first results.

About Plasmonics

Computing industry is rapidly moving from a programming to a learning era, where the 10 GMAC/s/W (MAC – multiply-accumulate operation) digital energy efficiency wall of current CMOS electronics and von-Neumann architectures cannot keep the pace with the new computational power metrics required. A new computing paradigm based on **non-von-Neumann layouts**, collocating memory and processing units and relying on the working principles of the human brain, has already begun to unfold, leading to the development of large neuromorphic machines that already exceed the overall efficiency of classical platforms. However, the current technology of both electronics and photonics is encountering difficulties in simultaneously improving the computational power and the energy- and footprint-efficiency of neuromorphic circuitry.

Being at the dawn of neuromorphic computing, a future-proof solution that could dominate this landscape for many years to come should obviously rely on the best-performing and top-efficient technology mixture. This is exactly where **plasmonics** comes to offer what electronics and photonics lack, a natural platform for synergizing photonic-level bandwidths with electronic-level sizes within an ultra-high energy efficiency envelope.

Gathered around this idea, 10 partners from 7 countries have united in launching **PlasmoniAC** project, aiming to take advantage of these fundamental benefits towards deploying and demonstrating a **neuromorphic plasmonic platform** that can optimize speed, energy and size-efficiency across all its constituent circuitry by utilizing and advancing the best-in-class technology and material platforms.

The outcome of the PlasmoniAC project – a radically new neuromorphic plasmonic circuit technology - perfectly responds to the **pressing industrial needs** for high-speed, energy- and size-efficient low-cost neuromorphic chips, offering a unique chance for strengthening the competitiveness of European photonics industry and putting European companies at world-leading position in the global neuromorphic and Deep Learning market.
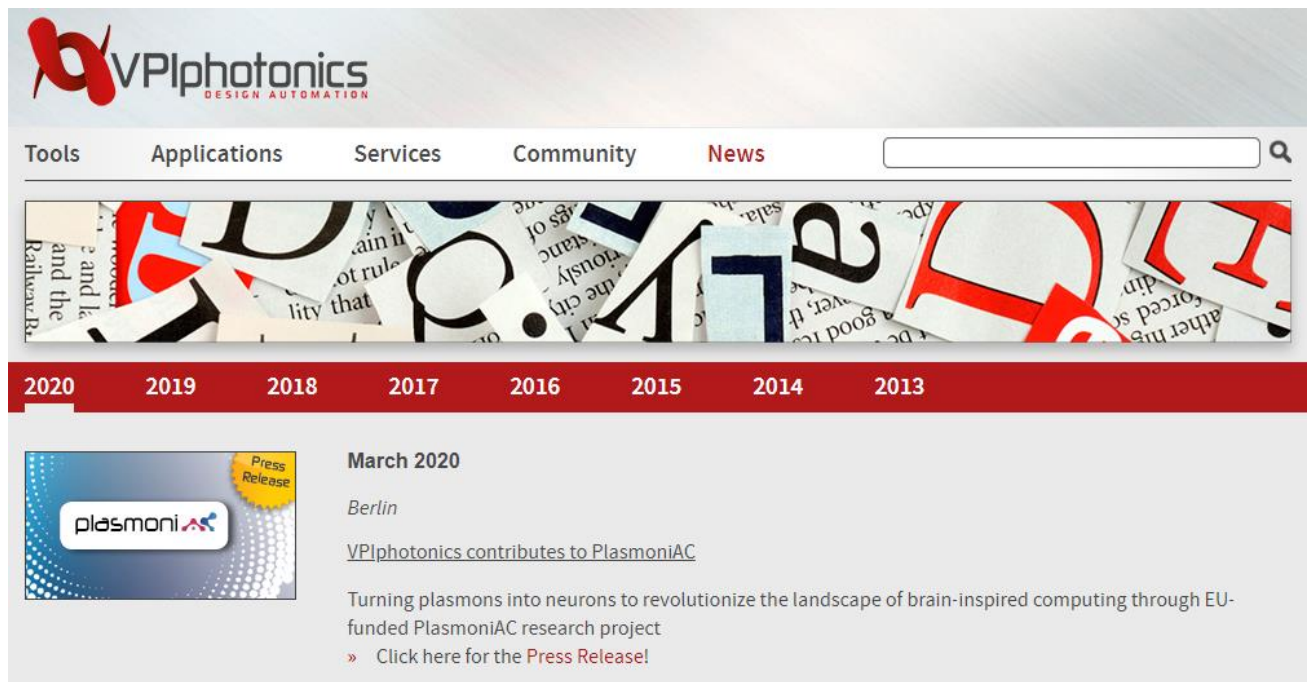
For further information, please visit http://www.plasmoniac.eu.

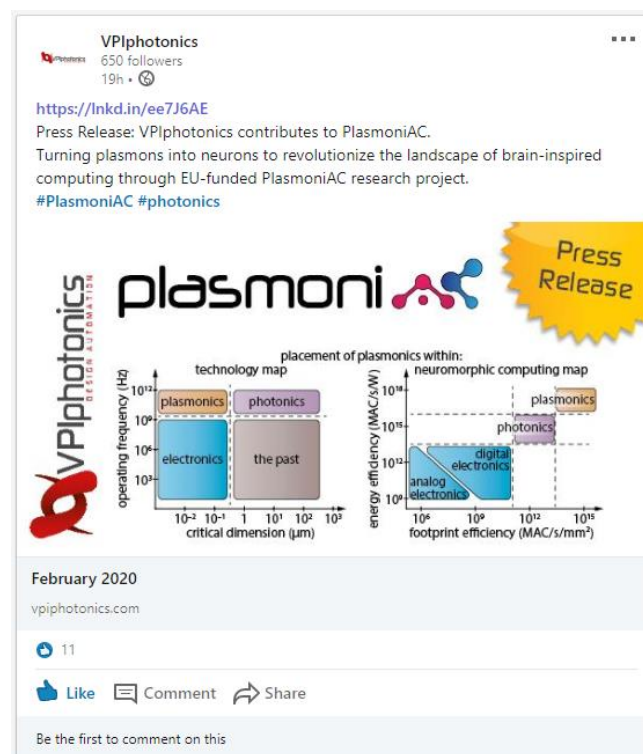| Dissemination Level :   Public |
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The link to the press release (Annex 1) and the screenshot from VPI's website/LinkedIn page can be found below:

Link: https://www.vpiphotonics.com/News/2020/index.php#PlasmoniAC

Website:

LinkedIn:
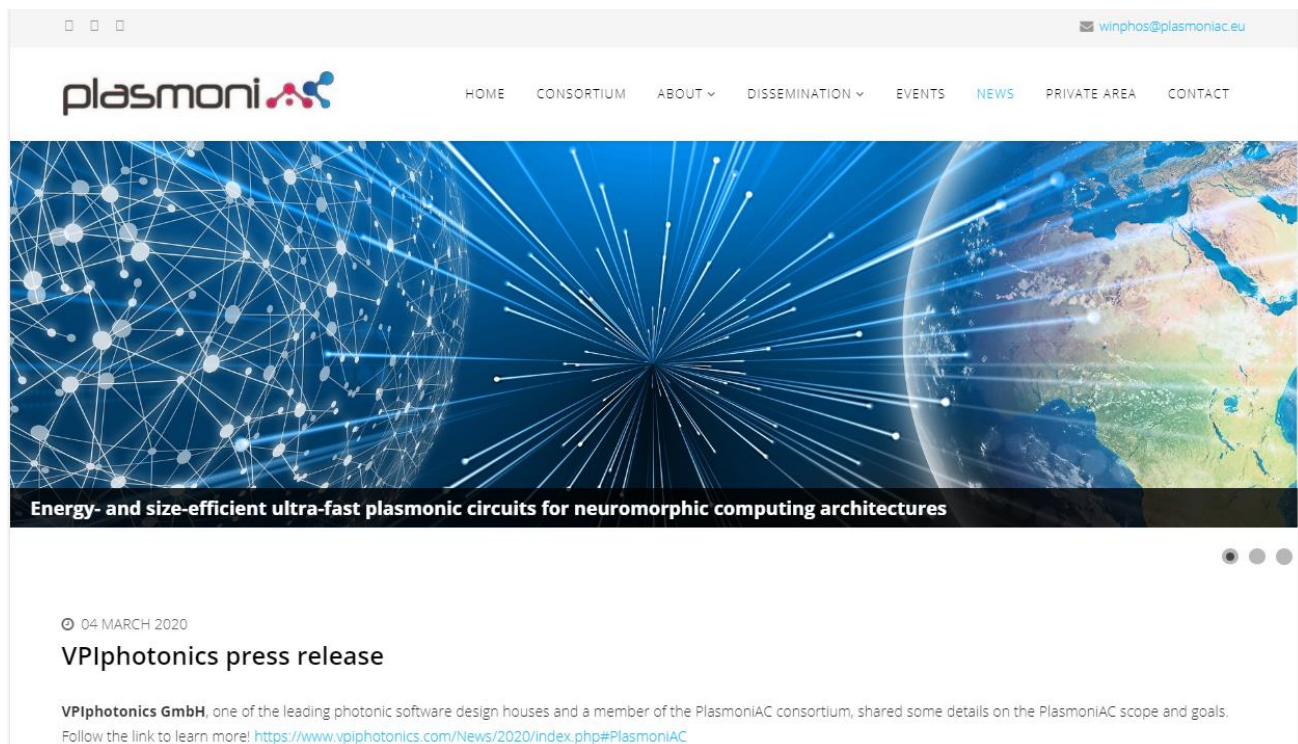
| Dissemination Level : Public |

4 Targeted audience and means for increasing visibility

Press release targets the following audience:

- Policy makers
- MPW service providers
- Research & education community
- Private Sector
- Related projects & initiatives
- General public

In order to increase the visibility of the PlasmoniAC project, the press release from the VPI's website has been linked to the project's official page:

and has been disseminated through the PlasmoniAC social media accounts:

LinkedIn:

| Dissemination Level : Public |

Facebook:

Twitter:

Dissemination Level :   Public

Annex 1: VPIphotonics Press Release

See pages 14 through 15.

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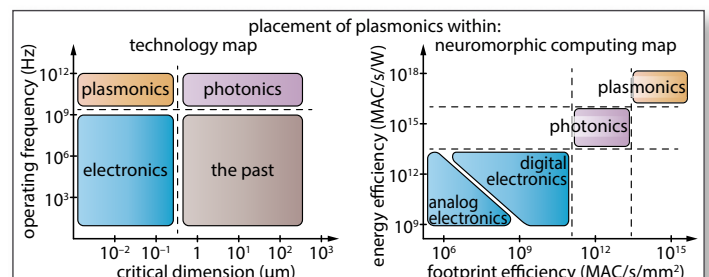Berlin, 2nd March 2020

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For further information, please visit http://www.plasmoniac.eu.

About VPIphotonics

VPIphotonics™ sets the industry standard for end-to-end photonic design automation comprising design, analysis and optimization of components, systems and networks. We provide professional simulation software supporting requirements of optoelectronics, integrated photonics and fiber optics applications, optical transmission system and network applications, as well as cost-optimized equipment configuration.

Our team of experts provides professional consulting services addressing customer-specific design, analysis and optimization requirements, and delivers training courses on adequate modeling techniques and advanced software capabilities.

VPIphotonics' award-winning off-the-shelf and customized solutions are used extensively in research and development, and by product design and marketing teams at hundreds of corporations worldwide for 20+ years.

Over 160 academic institutions joined our University Program enabling students, educators and researchers an easy access to VPIphotonics' latest modeling and design innovations.

For further information, please visit us at www.VPIphotonics.com