Neuro-augmented 112Gbaud CMOS plasmonic transceiver platform for Intra- and Inter-DCI applications

D7.4 Project video presentation

Project Information

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1 Executive Summary

This document presents information regarding the official NEBULA project video presentation, it's content, purpose, visual appearance and targeted audience. It also includes the screenshots of the relevant content, video description and narrated text.

2 Introduction

2.1 Purpose of this document

The objective of this deliverable is to present the official NEBULA video presentation, as well as its targeted audience and reach, in a view of KPIs set out in the Grant Agreement, Annex 1, Part B.

2.2 Document structure

The deliverable is split into following major chapters:

- NEBULA video overview
- NEBULA video narration
- Announcements

2.3 Audience

This content of this document is PUBLIC.

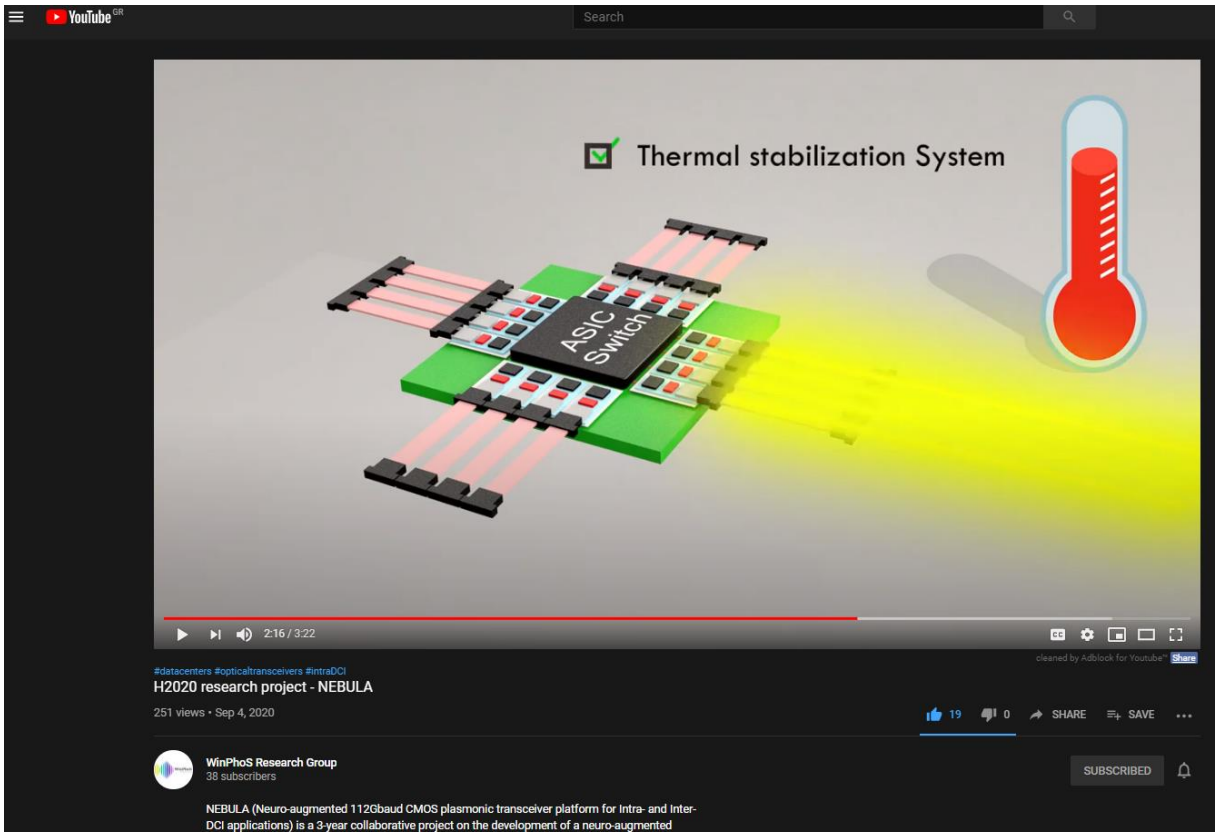
3 NEBULA video overview

The official NEBULA video presentation was released and it can be found at:

https://www.youtube.com/watch?v=hLdk1Zk6Yjs

and in the homepage of the NEBULA official website: http://nebula-h2020.eu/

The generated video aims at summarizing the project's vision and objectives in an easy-to-understand manner, placing them into the context of the modern information age needs, but also focusing on the key technical details of the project.



The diversity of the targeted audience, including policy makers, MPW service providers, research & education community, private sector, related projects & initiatives, and, finally, general public, shaped the video such that it offers all relevant information in a restricted timeframe of 3:22, increasing the chances for the audience to stay engaged from the beginning until the end of the video.

As of September 14th, the number of views stands at **286**, which is **57% of the KPI** (>500) set out in GA, Annex 1, part B, Table 18.

3.1 Video description

The following description has been added to NEBULA video presentation together with respective hashtags:

"NEBULA (Neuro-augmented 112Gbaud CMOS plasmonic transceiver platform for Intra- and Inter-DCI applications) is a 3-year collaborative project on the development of a neuro-augmented 112Gbaud CMOS plasmonic transceiver platform for Intra- and Inter-DCI applications that brings together twelve leading academic and research institutes and companies. NEBULA aims to provide the foundations for a common future-proof transceiver technology platform with ultra-high bandwidth capabilities offered by a CMOS

compatible toolkit and tailored towards meeting performance, cost and energy metrics in both inter-DCI coherent and intra-DCI ASIC co-packaged optics. NEBULA will be investing in the established bandwidth- and energy saving credentials of plasmonic modulator solutions together with the functional digital processing portfolio of neuromorphic optical reservoir computing engines towards painting the landscape of the next-coming disruption in transceiver evolution, tailoring them in System-in-Package prototype assemblies that can intersect with the challenging framework of both inter- and intra-DCI segments. The project was launched in January 2020 and it is funded by the European Commission through HORIZON 2020 framework targeting the topic ICT-05-2019: Application driven Photonics components.

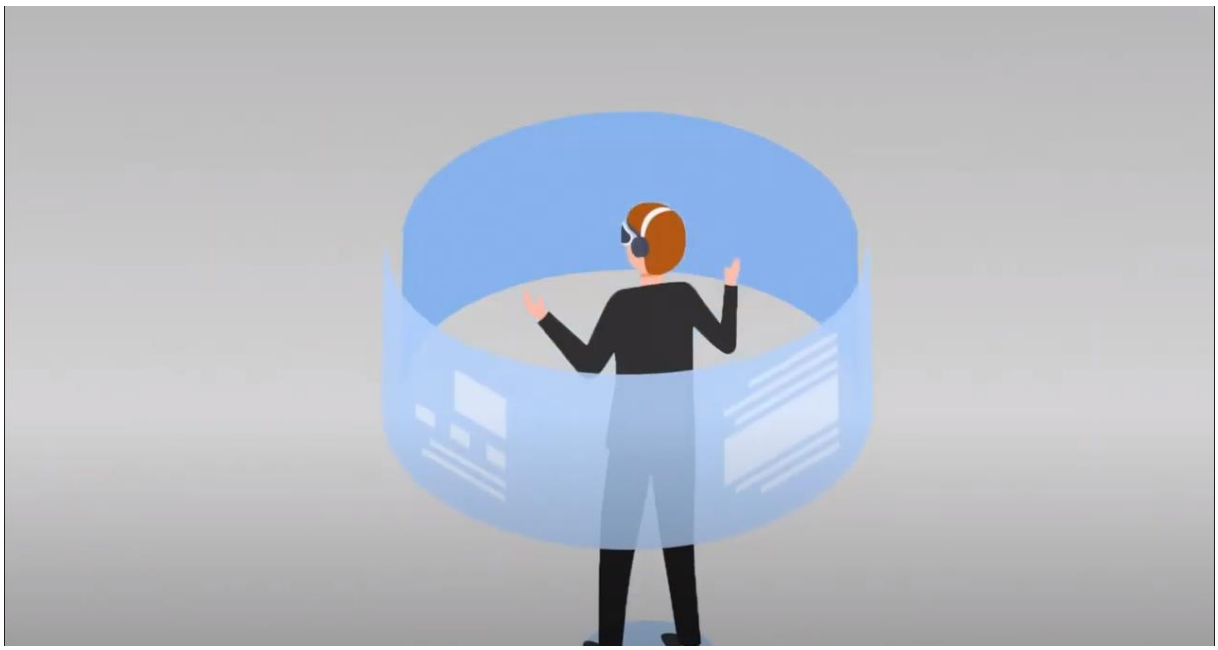
To learn more, visit http://nebula-h2020.eu/

#datacenters #opticaltransceivers #intraDCI #interDCI #interconnects #neuromorphic #reservoircomputing #h2020"

3.2 Video presentation

The video presentation of NEBULA starts by showing different devices around the world that are interconnected through the Internet, realizing the new trend of Internet-of-Things.

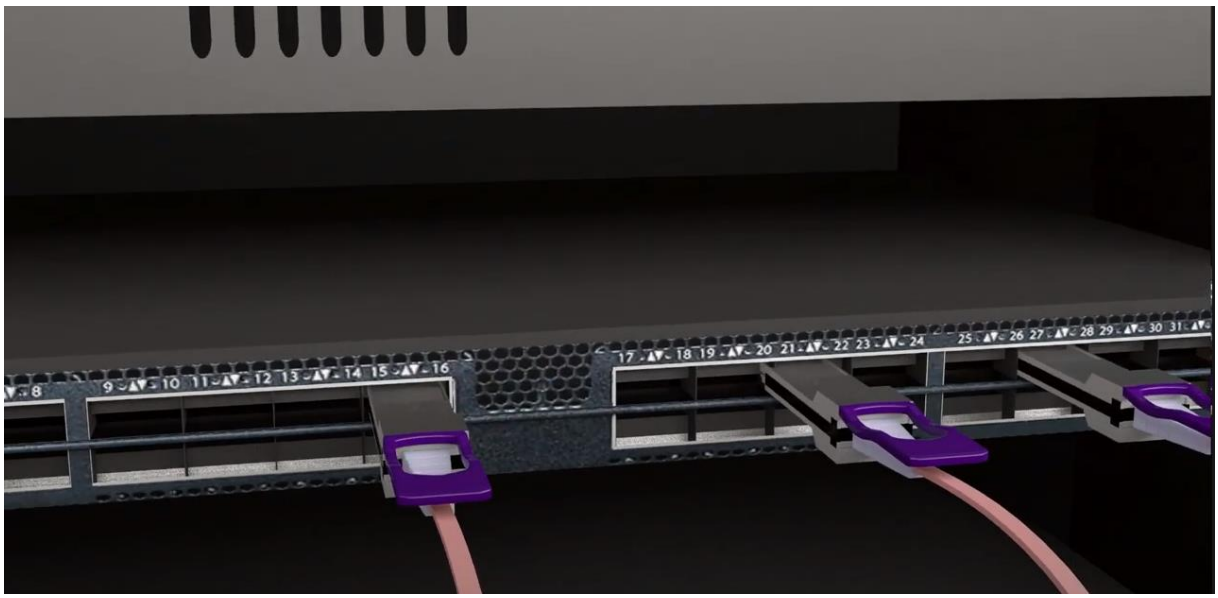
The story continues with the focus on the increased need for data movement, having as an example teleconferences allowing co-workers working from distance, the daily use of smartphone applications and the emerging technologies such as augmented reality.



The video makes a transition to datacenters, which are the main core of data processing and storage, highlighting the extreme amounts of data flooding the thousands of datacenter servers.

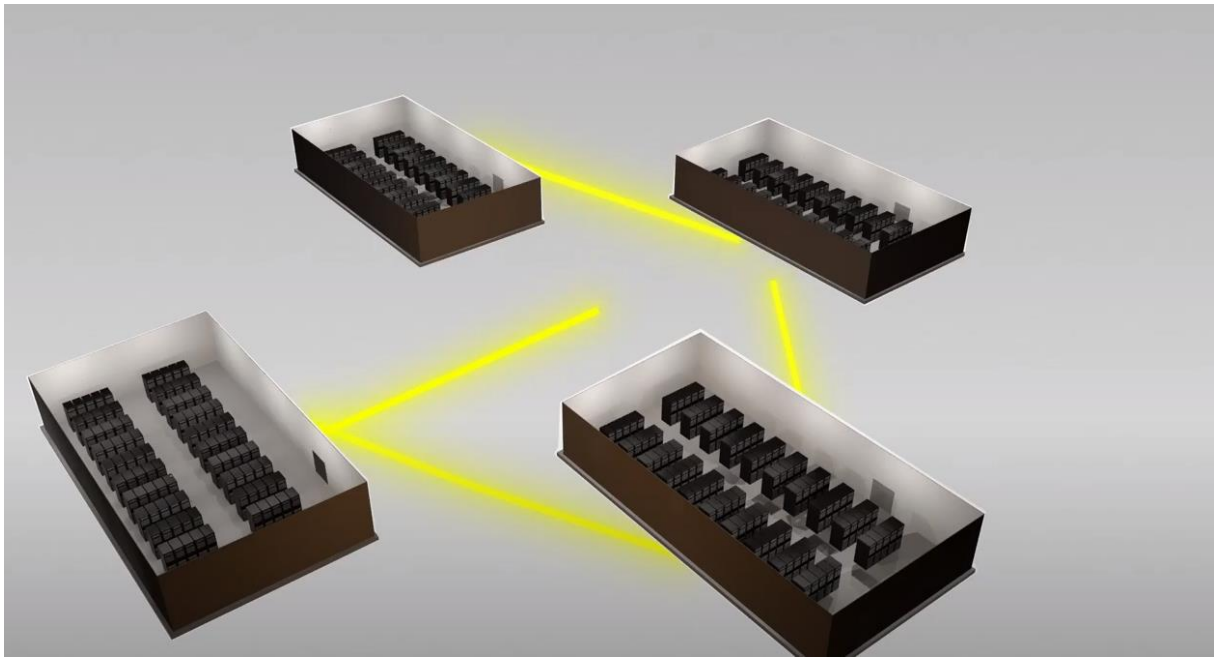
The video first focuses in the intra-datacenter interconnection domain by visualizing the current trends: i.e. the replacement of bulk copper cables with optics, so as to highlight the need for faster and more energy efficient optical interconnect modules in this domain.

Copper interconnects



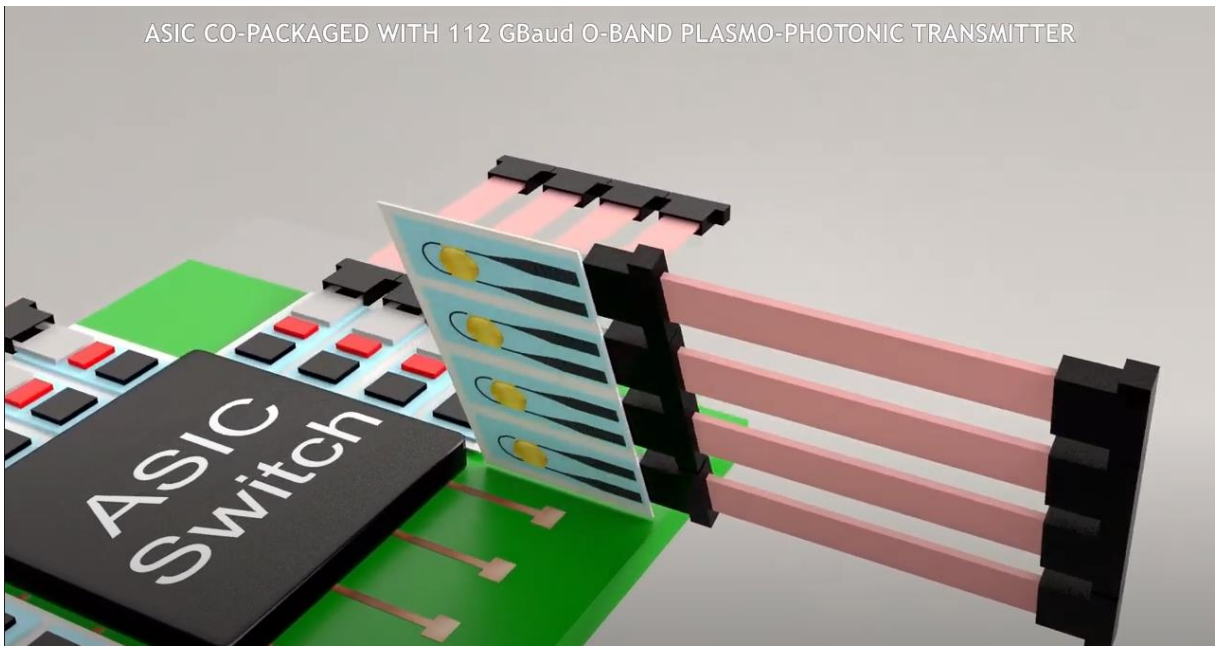
Optical Interconnects

The video moves to the inter-datacenter interconnection domain explaining why it is a vital part of data movement and storage in the current datacenter deployments. The inter-datacenter connectivity is visualized by the following scene.

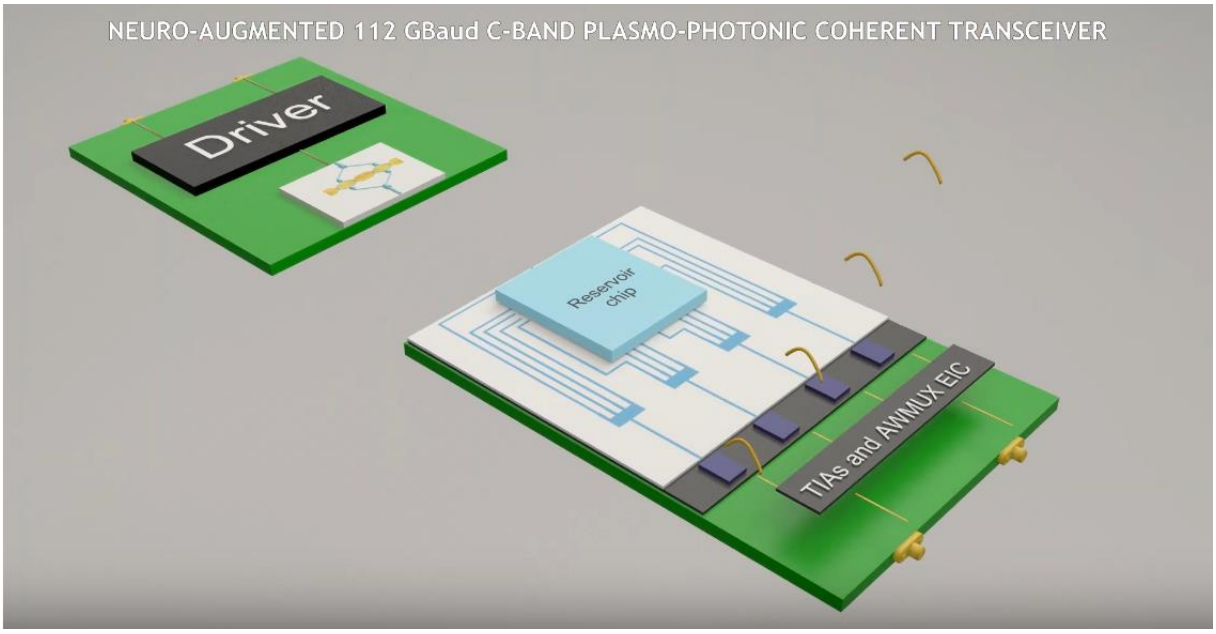


Having highlighted the two application areas targeted by the NEBULA project, the video continues with the introduction of the two transceiver demonstrators of NEBULA.

First, the co-packaged prototype of NEBULA for intra-datacenter connectivity is presented, i.e. the O-band plasmo-photonic transmitter co-packaged with ASIC targeting 112 Gbaud operation. The video shows the building blocks of the co-packaged transmitter, i.e. the miniaturized plasmonic disk modulators, the data generating ASIC and the novel plasmonic thermal stabilization system called "PTS".



The second prototype of the project is then introduced, i.e. the C-band plasmo-photonic coherent transceiver targeting to 112Gbaud operation. The second NEBULA prototype is presented as separate transmitter and receiver modules so as to highlight the plasmo-photonic transmitter sub-module and the novel neuro-augmented receiver sub-module that will bring coherent signal DSP realized by the means of the neuro-augmented reservoir-based photonic processor together with their high-speed driving electronics.



The video concludes with the presentation of the NEBULA consortium and by acknowledging the EU Horizon 2020 tframework and the European Technology Platform Photonics21.


European Commission
Horizon 2020
European Union funding
for Research & Innovation
PHOTONICS21
imec
GHENT UNIVERSITY
ETH zürich
LIGENTEC
ADVA
Lumiphase
cnrs
IBM
Mellanox
8 Institutes
5 Companies

4 NEBULA video narration

The video presentation script as follows:

Introduction (0:00-01:24)

With tens of billions of devices connected through the "Internet of Everything", data and communications become the essential ingredients of our modern world. More and more businesses and professionals connect and work together from distance through teleconferences, more people use smartphone applications daily, and brand-new technologies arise, like augmented reality, all pushing for extreme data transfer and processing. After transferred through the Internet, this huge amount of data needs to be stored and processed before reaching again the end user. Hence, this data floods the servers of the Data centers around the world. Some application data gets processed within the same Data center pushing for high-performance intra-Data center interconnects, while other application data gets processed in nearby Data centers requiring high-performance inter-Data center connectivity. With the required bandwidth of these interconnects increasing, the bulk copper cables cannot keep up anymore and both intra- and inter-datacenter electrical links are replaced by optics. Data center operators are trying to follow this trend by setting the following question: Can we fulfill the bandwidth demand without increasing the cost or power consumption?

NEBULA technology (1:25-2:49)

For the consortium of NEBULA, the answer is absolutely yes! In doing so, NEBULA will equip the cost-effective Silicon Nitride photonic integration platform with low-footprint and energy-efficient active components. As a result, NEBULA will meet the bandwidth requirements of tomorrow's intra- and inter- Data center interconnects. By bringing closer optics with electronics in order to drastically reduce footprint and power consumption, NEBULA aims to shape the framework for the delivery of an electronic ASIC co-packaged with CMOS-plasmo-photonic modulators, achieving 112 GBaud data rates that will enable the next generation of intra-Data center interconnects. The stable operation of this novel platform inside of such a harsh environment will be guaranteed by introducing a lossless thermal stabilization circuit called PTS. In order to cover Inter-Data center distances, NEBULA will also develop a coherent transceiver at 112 Gbaud relying in plasmo-photonic technology and ultra-fast BiCMOS electronics. In order to mitigate the signal impairments of the link, a neuro-augmented opto-electronic signal processing engine will be employed at the receiver side. Hence, NEBULA will eliminate the conventional electronic DSP resulting in energy savings of 93%!

Outro (2:50-3:22)

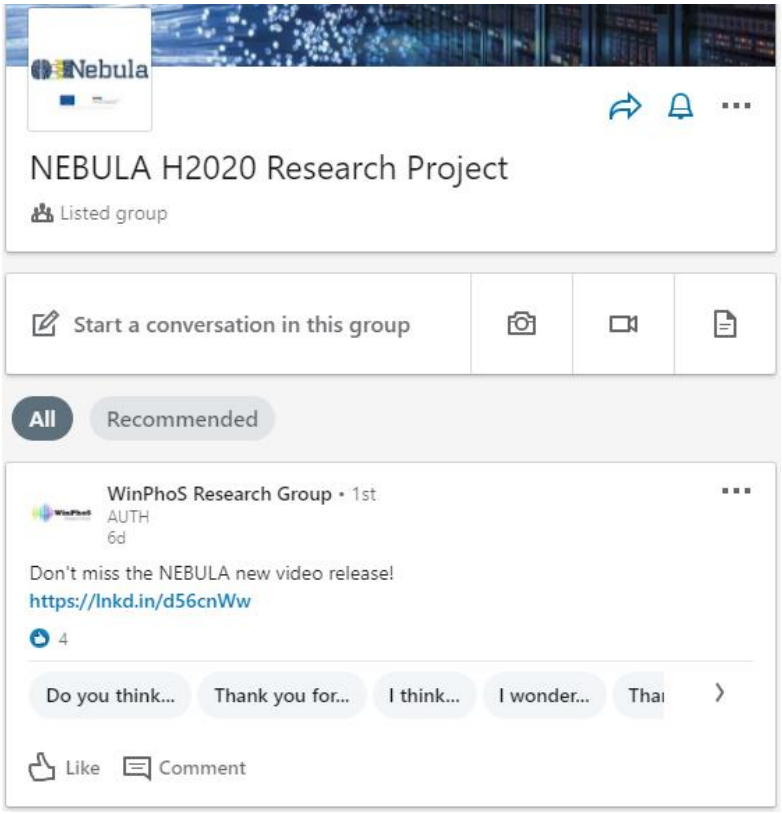
NEBULA is a three-year collaborative project on neuro-augmented plasmonic transceiver platform for Intra- and Inter-data center interconnect applications that brings together 8 academic and research institutes with 4 companies being led by the Aristotle University of Thessaloniki in Greece. The project was launched in January 2020 and has received funding from the European Union's Horizon 2020 ICT Research and Innovation Programme.

5 Announcements

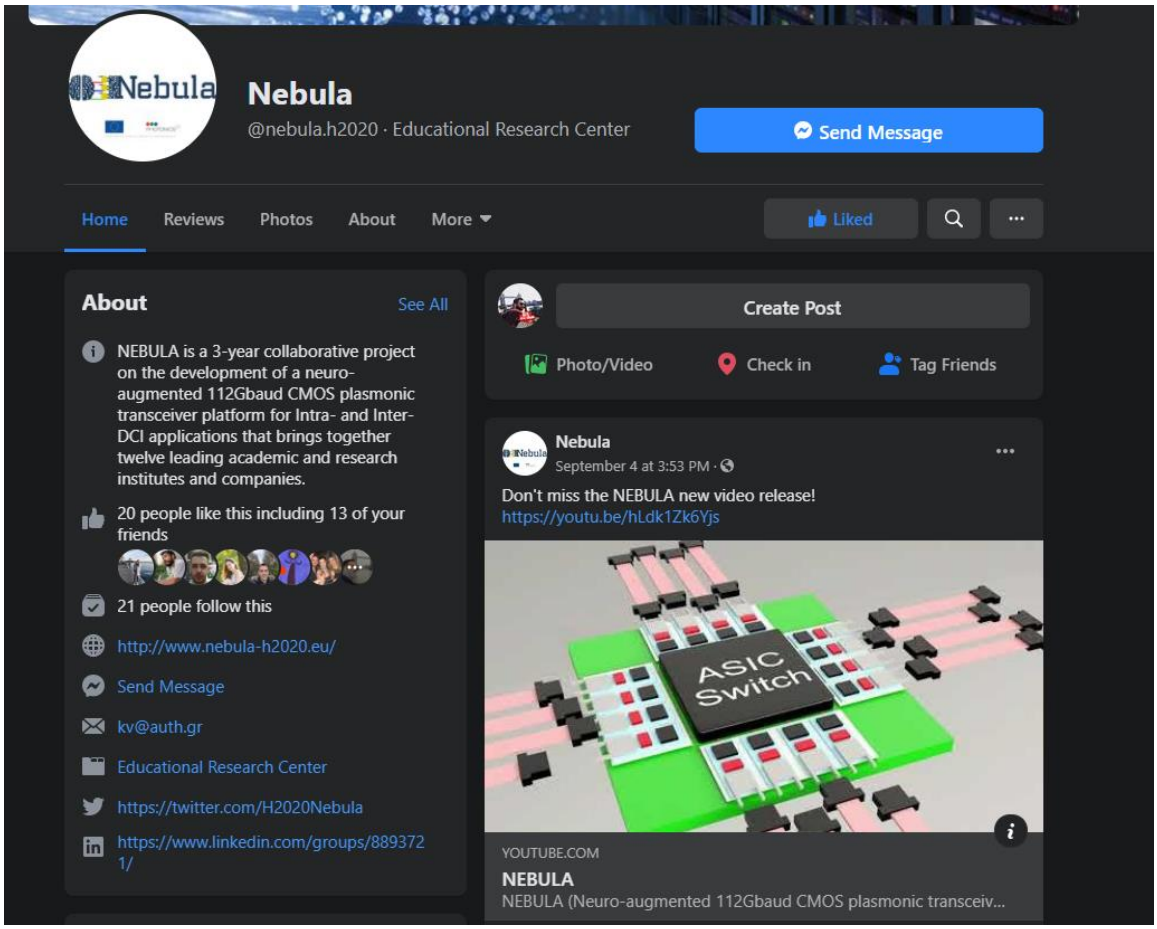
The video release was announced in the project's website and in all major social media platforms (Facebook, LinkedIn, Twitter) with all partners sharing its release through their communication channels.

NEBULA official website:

LinkedIn:



Facebook:



Twitter: