TERABOARD

www.teraboard.eu

High bandwidth density and scalable optically interconnected Terabit/s Board

H2020-ICT-2015 n°688510

Press release

Deliverable 7.5

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Acknowledgements and Copyright

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Abstract

Deliverable 7.5 contains the final Press Release of the project and a links to websites where the Press Release has been published.

Press Release

The final Press Release of TERABOARD project was realized and disseminated. It is reported below:

TERABOARD paves the way to a high bandwidth density low power consumption integrated photonic interconnection for chip-to-chip and board-to-board communications

TERABOARD (*High bandwidth density and scalable optically interconnected Terabit/s Board*), EU project granted in 2015, during 48 months of developments has solved a number of challenges regarding high bandwidth density communications in a high confinement scenario, such as advanced datacom systems in data centers, as required by Ericsson, STM and Nokia. Silicon photonics active devices, developed by imec, were co-integrated with 3D-IC modules such as through-silicon vias (TSVs) of 10 µm diameter and 100 µm depth and 50 µm-pitch micro-bumps at wafer scale, opening the path for high density and low parasitic stacking of electrical and silicon photonics dies, to enable significantly improved high-speed interconnections compared to wire-bonding. The co-packaging of electrical drivers and TIAs with the silicon photonics SiGe EAM (electro absorption modulator) and/or Si microring modulators and Ge detectors has demonstrated very high performance at data rates up to 70 Gb/s for EAMs and 80 Gb/s and even 90 Gb/s for Ge waveguide detectors, with an overall energy cost of the transceiver of 3 pJ/bit for each electro-optical port (electrical and optical). The results have been also tested for typical data center distances of 3 km with almost unchanged performances at high data rate. On the demo board driven by an FPGA, error free communications at the receivers were tested by Ericsson and CNIT up to 50 Gb/s per channel. Considering that a large count of optical interconnects was one of the goals of the project, two further main technical advances have been reported. A low profile (1 mm) and low loss (1.7 dB) twelve-fiber optical connector, released by CNIT with CNR and UPV, directly mounted on the silicon photonics circuit has been demonstrated. A passive optical routing system based on an optical multilayer redistribution architecture was also shown. This latest system by CNIT is a stack, assembled by UPV, of at least two silica planar lightwave waveguide layers connected through vertical optical VIAs developed by CNR. With this method many optical links can be routed without resorting to complicated and lossy WDM systems requiring laser wavelength selection and control. All the results have been disseminated by EPIC in many events. TERABOARD has found immediate development demand by one of the partner companies, thanks to the high bandwidth density transceiver achievements and the promising resolution of connectivity limitations.

TERABOARD gathers the following beneficiaries:

- Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy – *Coordinator*
  - Fondazione INPHOTEC, Italy –*Linked third party*
- Ericsson Research, Italy
- STMicroelectronics, Italy
- imec, Belgium
- Nokia System Networks Italia, Italy
- Consiglio Nazionale delle Ricerche (CNR), Italy
- Universitat Politecnica De Valencia (UPV), Spain
- European Photonics Industry Consortium (EPIC), France

Published news on TERABOARD

Websites reporting the final Press Release of TERABOARD:

Photonics Views

Novus Light

CNIT (also on LinkedIn and Twitter)

imec

Further websites to which the Press Release has been sent and should appear:

PIC Magazine

Electro Optics

Photoniques

Photonics Media

Optics.org

EPIC will promote these publications through their social media.

Conclusions

In fulfillment of communication requirements, at the end of TERABOARD project a Press Release has been redacted and disseminated, to contribute to the achievement of an effective impact and dissemination of the project.