

Photonic Integration in Converged Data Centre Systems

Richard PITWON^{1*}

¹Seagate, 1000 Langstone Technology Park, Havant, Hampshire PO9 1SA, United Kingdom
*richard.pitwon@seagate.com

System embedded photonic interconnect has been a strong area of focus in the European funding programmes for collaborative research and technological development over the past 15 years. This is particularly evident in projects from the Sixth Framework Programme (FP6), which ran from 2002 – 2006 [1], the Seventh Framework Programme (FP7), which ran from 2007 – 2013 [2] and the current Horizon2020 programme, which started in 2014 and is due to end in 2020 [3].

The PhoxTroT project [4] is a four year project, with a large consortium of 18 European organisations led by Fraunhofer IZM as project coordinator. PhoxTroT is an acronym of the full project title: “Photonics for High-Performance, Low-Cost & Low-Energy Data Centers, High Performance Computing Systems: Terabit/s Optical Interconnect Technologies for On-Board, Board-to-Board, Rack-to-Rack data links”.

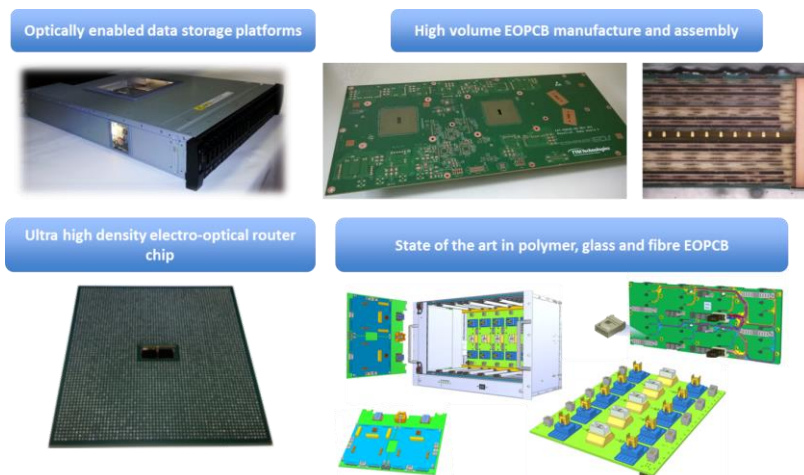


Fig. 1. PhoxTroT vision: On-chip, chip-to-chip, board-to-board and rack-to-rack optical interconnect solutions deployed in PhoxTroT demonstration platform

The vision of this large scale “Integrated Project” is to develop an entire technology portfolio of cost- and energy-efficient Tb/s-scale on-chip, chip-to-chip, board-to-board and rack-to-rack level photonic interconnect solutions within data centre and HPC

architectures. COSMICC (“CMOS Solutions for Mid-board Integrated transceivers with breakthrough Connectivity at ultra-low Cost”) is a three year research project, supported by the Horizon2020 Framework Programme and led by CEA-LETI, which brings together key industrial and research partners including ST-Microelectronics, Finisar and Seagate [5]. The purpose of the project is to enable mass-commercialisation of silicon photonics based transceivers by enhancing the existing photonic integration platforms ST-Microelectronics and to ultimately deploy in data centre systems. The COSMICC transceiver technologies will be mounted in a series of optical interconnect test platforms, one of which is shown in Fig. 2.

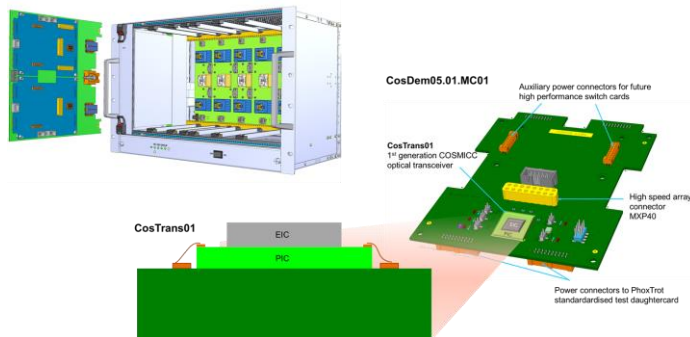


Fig. 2. COSMICC transceiver test platform

Seagate is developing a cross-project initiative called “PhoxLab”, which will allow advanced technologies and demonstration platforms from different international projects to be tested with respect to one another. Phoxlab defines sub-system card form factors, which can be disseminated to allow other projects to design test board platforms enabling advanced optical transceivers or switches (such as silicon photonics devices), optical circuit boards and connectors to be mounted into different systems of varying complexity and Technology Readiness Levels (TRLs).

It is envisaged that COSMICC and other European, as well as international projects developing technologies in this sphere will be able to vastly expand their performance evaluation by participating in the initiative. This work was supported by the European Commission through the Horizon2020 COSMICC project.

References

- [1] European Commission, “Sixth Framework Programme.” [Online]. Available: https://ec.europa.eu/research/fp6/index_en.cfm.
- [2] European Commission, “Seventh Framework Programme.” [Online]. Available: <http://cordis.europa.eu/fp7>.
- [3] European Commission, “Horizon 2020.” [Online]. Available: <https://ec.europa.eu/programmes/horizon2020>.
- [4] Tolga Tekin, “PhoxTrot project.” [Online]. Available: <http://www.phoxtrot.eu/>. [Accessed: 16-Nov-2015].
- [5] CEA-LETI, “Horizon 2020 COSMICC project.” [Online]. Available: <http://www.h2020-cosmicc.com>.