REVIEW MEETING

OPENPICS

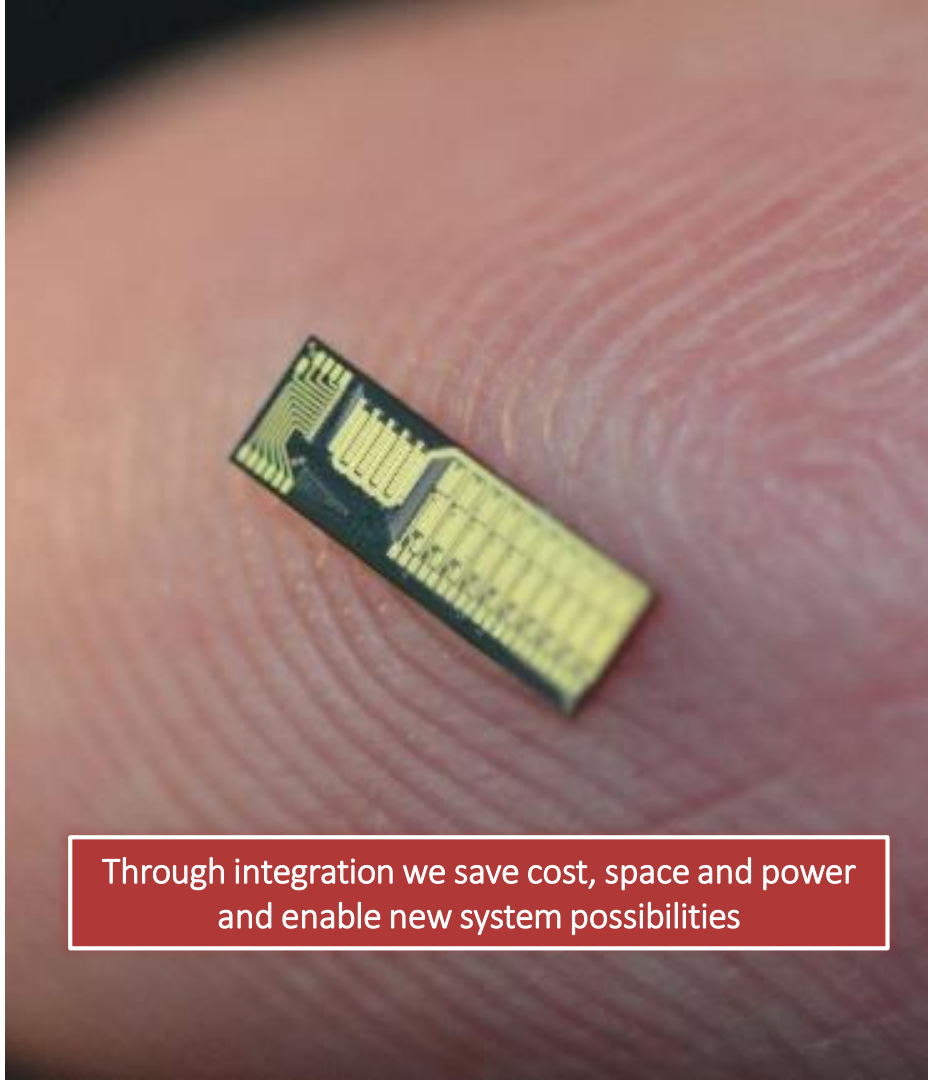
EFFECT PHOTONICS CONTRIBUTION

29-08-2017

EFFECT PHOTONICS

OVERVIEW

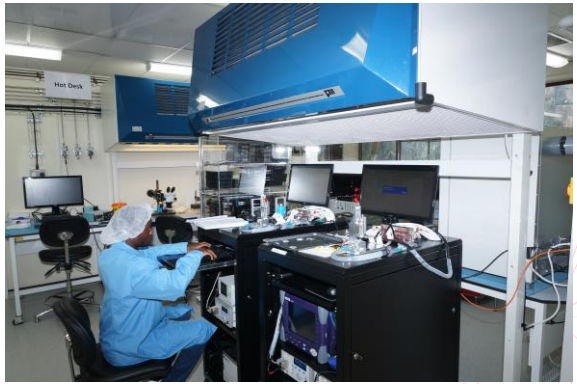
- Intro EFFECT Photonics
  - EFFECT Photonics approach
- Hardware development roadmap
- Technology development within OpenPICs
- 400G TX chip proposal



EFFECT PHOTONICS

- Providing cost effective photonic integrated DWDM devices for communication systems by:
  - Designing and developing photonic components
  - Combining optical functions into a system-on-a-chip through integration
  - Using our unique photonic packaging to scale in volume cost effectively

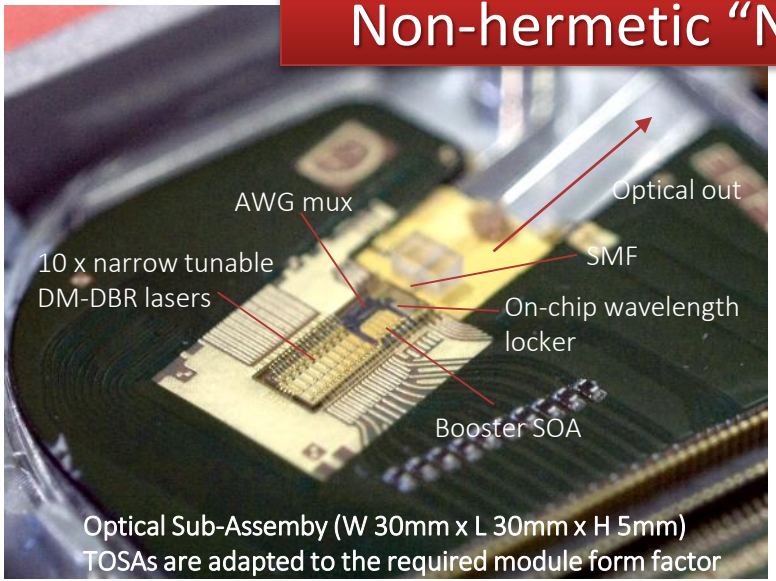
- HQ EINDHOVEN, NETHERLANDS
  - Global hotspot for integrated photonics & systems
  - Chip and Engineering expertise
  - Spin out from the Technical University
- SUBSIDIARY BRIXHAM, UK
  - High quality production & office facility
  - Automated volume manufacturing



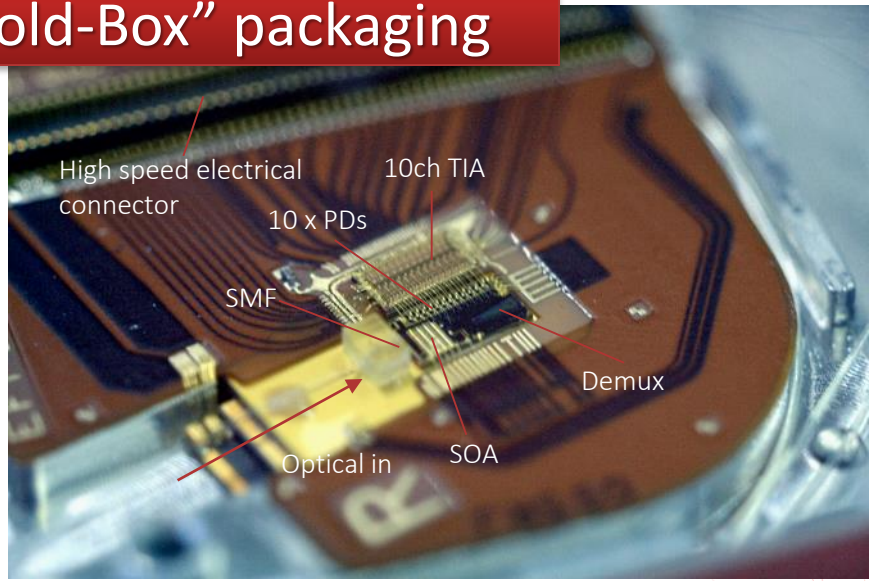
NOVEL PACKAGING APPROACH

- 10-ch Transmit OSA
- 10-ch Receive OSA

Non-hermetic “No Gold-Box” packaging



Optical Sub-Assemby (W 30mm x L 30mm x H 5mm)
TOSAs are adapted to the required module form factor



- Each OSA contains the optical ‘System-on-Chip’ PIC mounted to a high speed RF optimised PCB + electrical connector and fiber aligned to SMF, will be qualified to Telcordia
- ‘**Package-less**’ design reduces RF ‘reflections’ from chip to the module and **reduces cost**
- A Multi-Chip Module technology to integrate photonics and multiple ICs

Exceeds Telcordia damp-heat standards

EFFECT PHOTONICS

PRODUCT HARDWARE DEVELOPMENT ROADMAP

Multichannel Program: Hardware development towards coherent

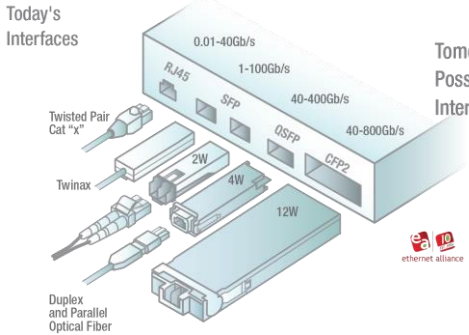
Multi-channel	10λx10G CFP	4λx50G	4λx100G	Coherent Demonstrator
Single-channel	SFP for Lineside	SFP for Fronthaul	SFP for 5G networks	SFP for Next-Gen Datacenters

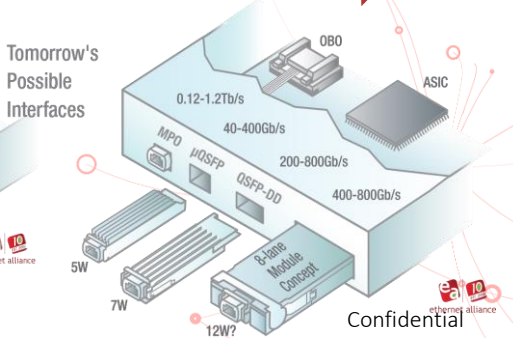
SFP Program: One product, 4 target applications

Datasheets locked down,
Volume and lead customer understood, in financial plan

Datasheets in negotiation,
market interest is there but price & volume TBD

Planned hardware development,
funded by subsidy program, may lead to products in future



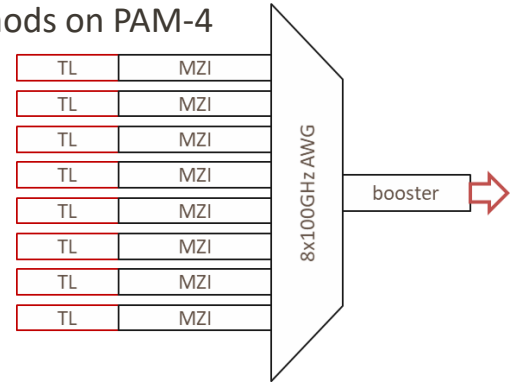


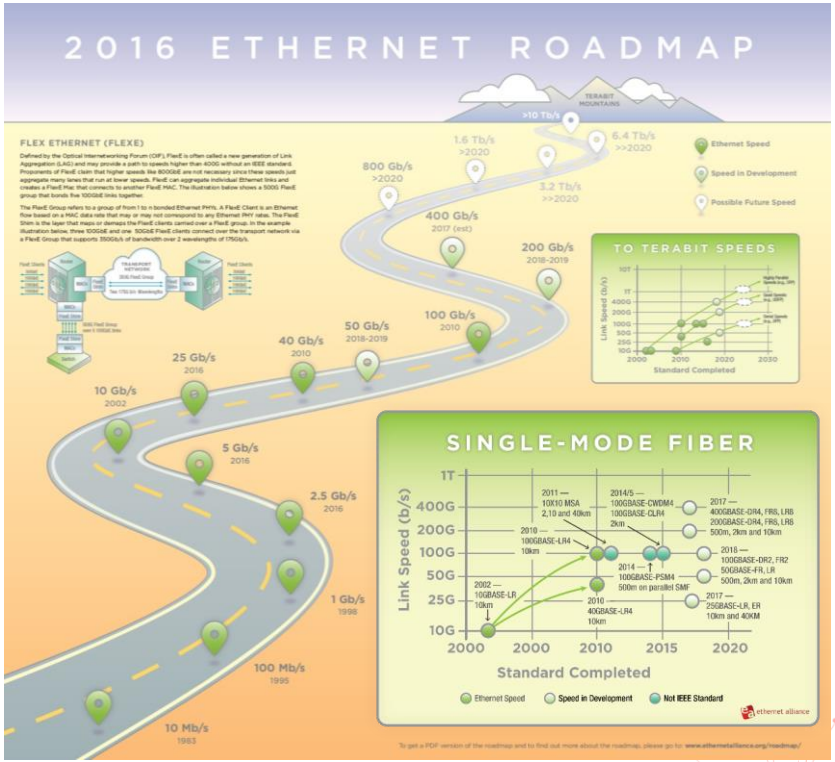
TECHNOLOGY DEVELOPMENT WITHIN OPENPICS

- PROCESSES
  - SI substrate
  - Stepper and scanner lithography
  - Improved passivation
  - Better planarization
  - Al-containing MQW
  - Zn-diffusion
- INTEGRATED BUILDING BLOCKS
  - Spot size convertor
  - Tunable laser
  - High BW, efficient modulator/ RF lines
  - Low-loss, wavelength accurate mux
  - Low-loss, wavelength accurate demux
  - Fast and sensitive PD

400G TX DEMONSTRATOR CHIP

- Several options, depending on line rate and level of integration
  - 16λ×25Gbps, 8λ×50Gbps, 4λ×100Gbps, …
- Proposed solution is 8λ×50Gbps
  - 8λ lanes × 50GBd mods
  - 8λ lanes × 25GBd mods on PAM-4

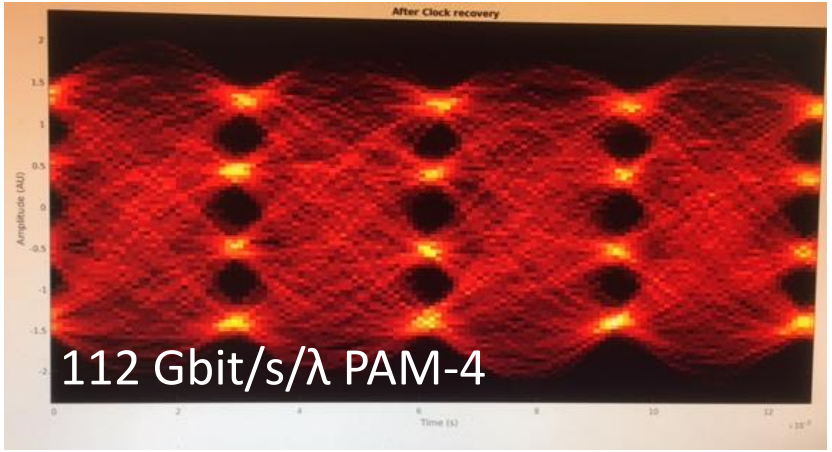


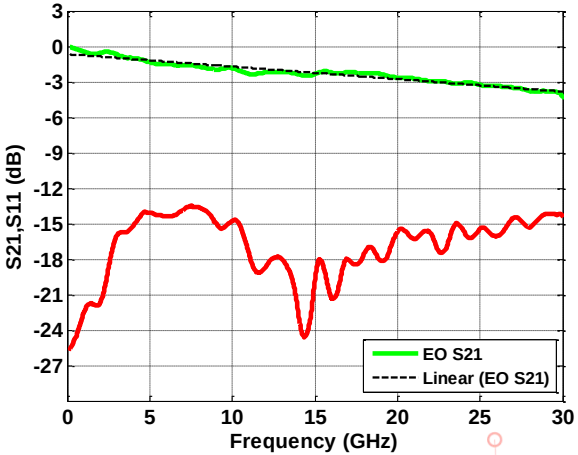


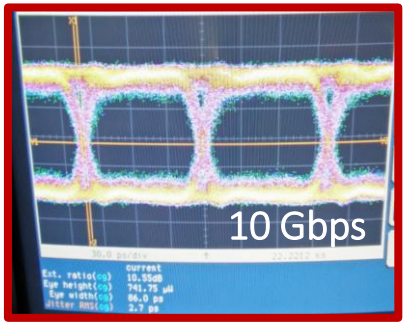
- EP's preferred solution is 4λ × 50GBd mods on PAM-4

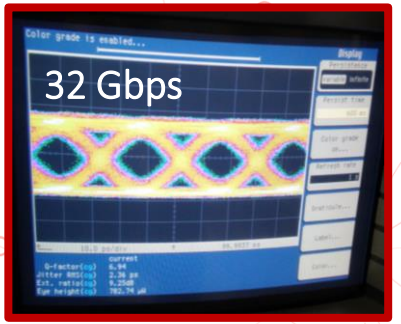
RECENT PUBLICATION: 112-GBPS PAM-4 TRANSMISSION

- 112-Gbit/s/λ PAM4 Transmission enabled by a Negatively-Chirped InP-MZ Modulator









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