

The background of the slide features a large, light blue circular seal of Yonsei University. The seal contains a shield with a central emblem, the year '1885' at the bottom, and the university's name in English ('YONSEI UNIVERSITY') and Korean ('연세대학교') around the perimeter.

2025 Workshop

Kihun Kim

2025 Work

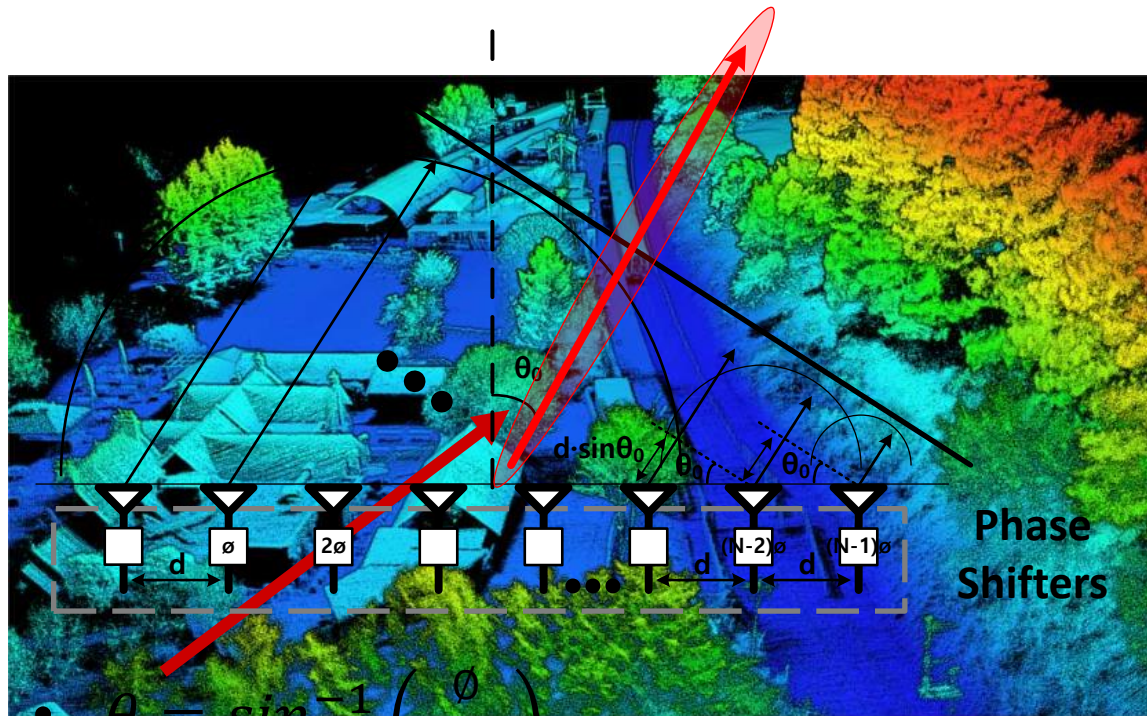
■ OPA Driver IC

- 32-ch DAC based driver IC measurement(TSMC2410)
- On-chip calibration algorithm for OPA

■ VCSEL Tx

- PAM-4 Transmitter with CZ-CTLE design & measurement
(SEC2505, SEC2601)

OPA

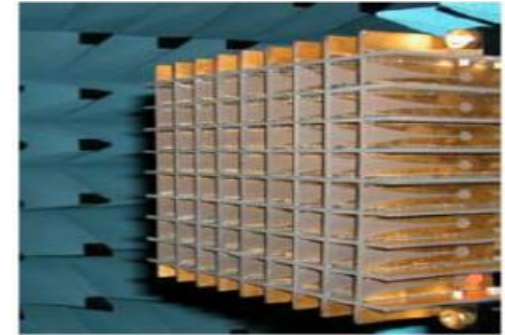


- $\theta = \sin^{-1} \left(\frac{\phi}{\frac{2\pi}{\lambda} \cdot d} \right)$

[Velodyne Lidar]

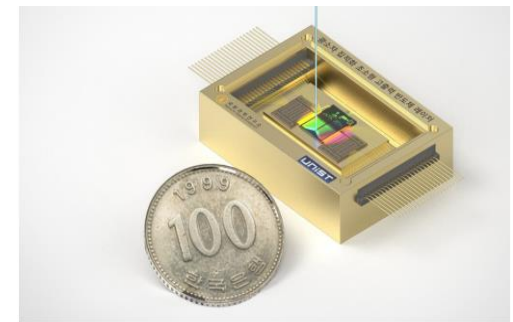
- Smaller chip size
- Narrower beamwidth

RF phased array



[T. Latha *et al.*, *IEEE Access*, 2021]

Optical phased array

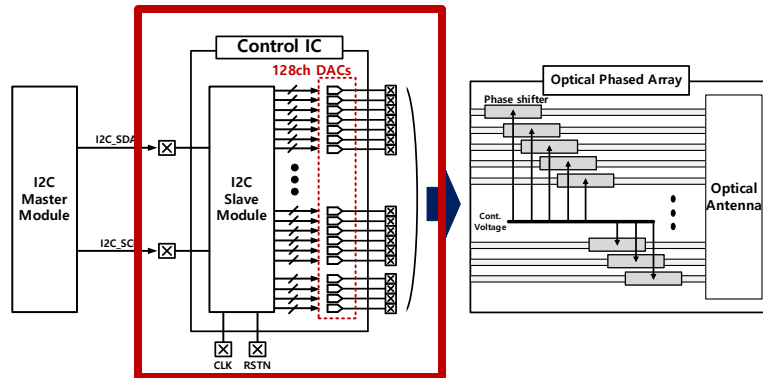


OPA Driver IC

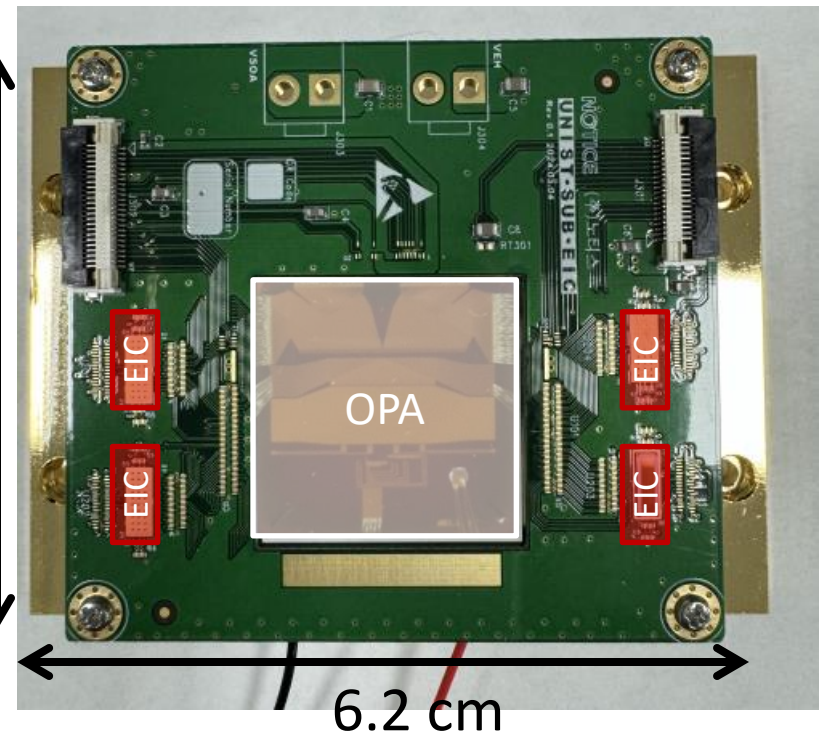
Control
Board

EIC

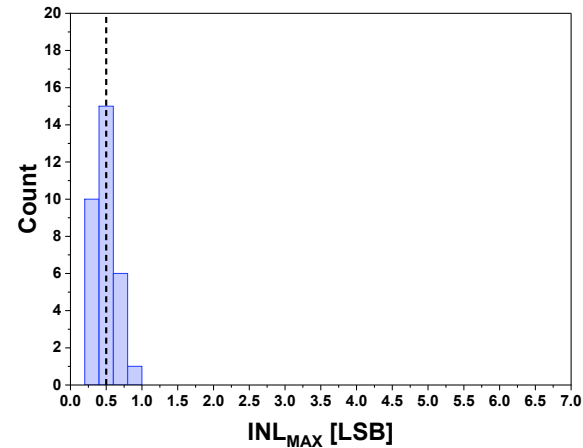
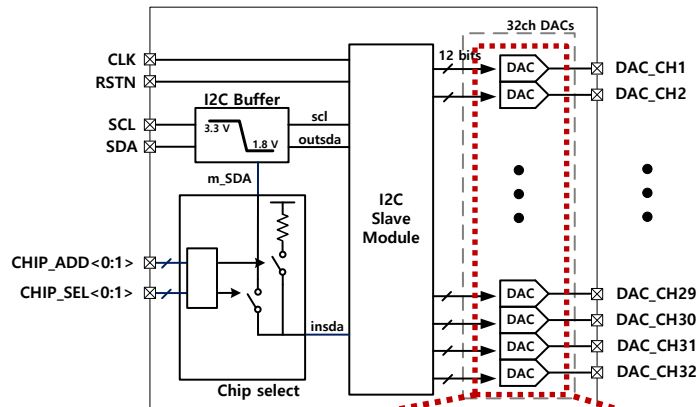
OPA



5.7 cm



OPA Driver IC



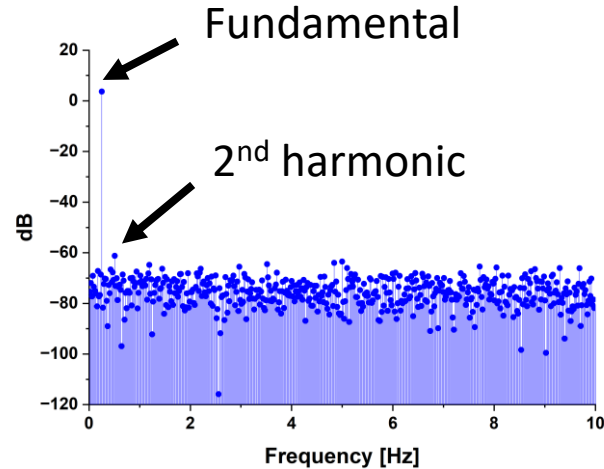
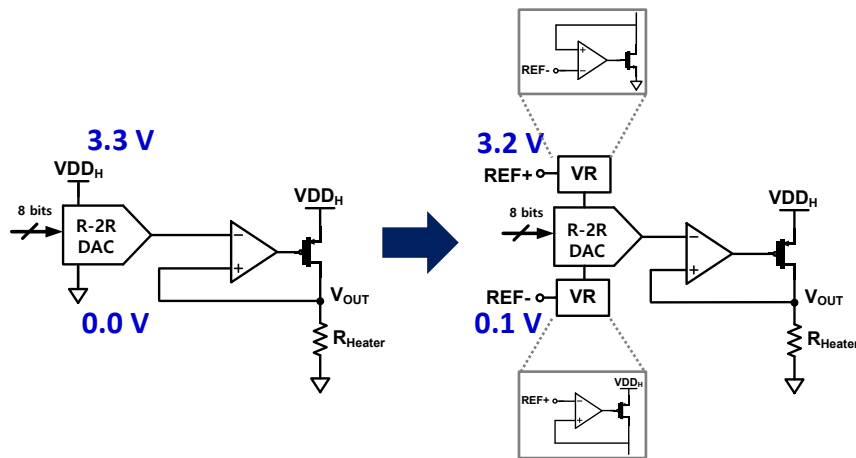
Range :
0.22 – 0.81 LSB

Average :
0.49 LSB

INL_{MAX} < 0.5 :
21 of **32**

TSMC2304

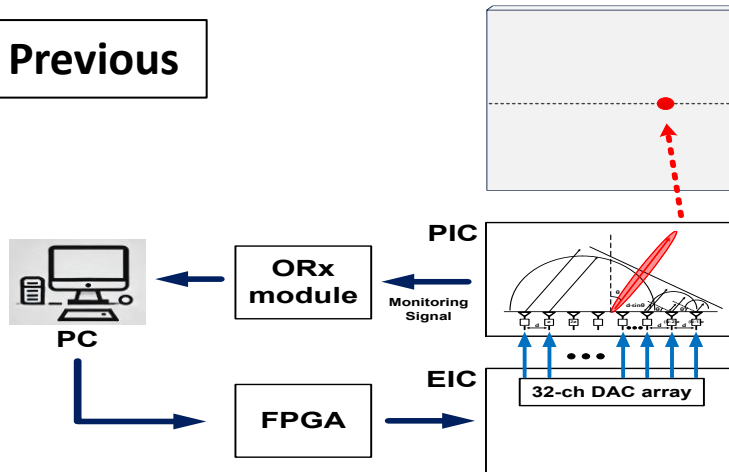
TSMC2410



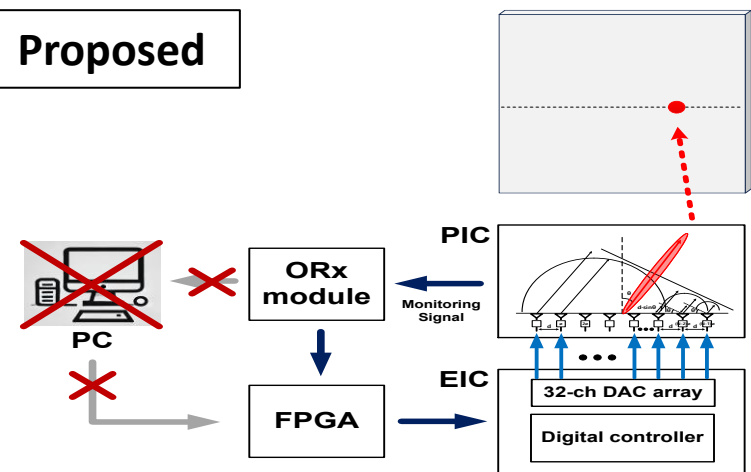
ENOB : 7.95 bits

OPA Calibration algorithm

Previous

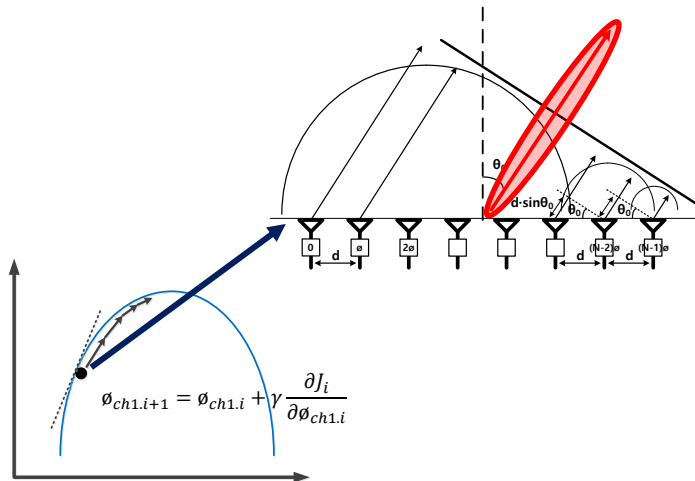


Proposed

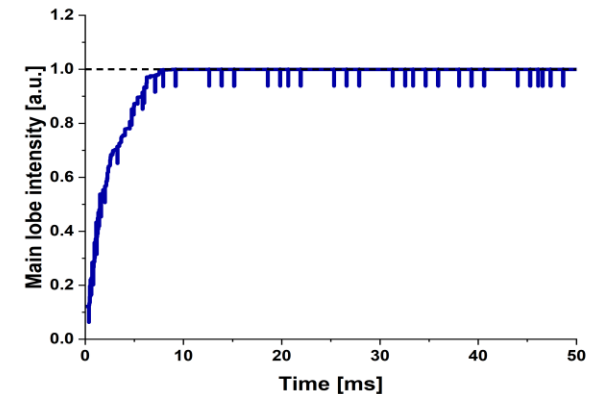


Calibration Algorithm

Gradient Ascent Algorithm



Simulation result

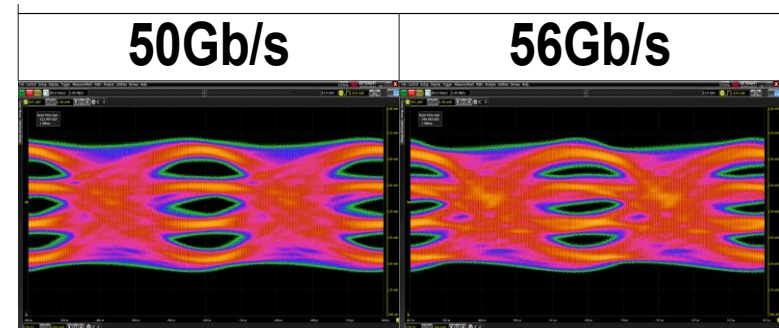
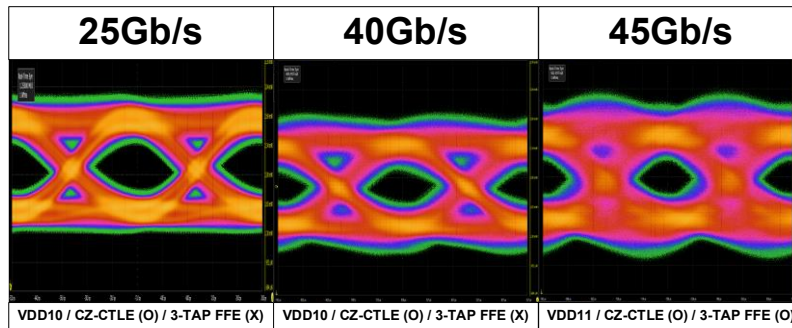
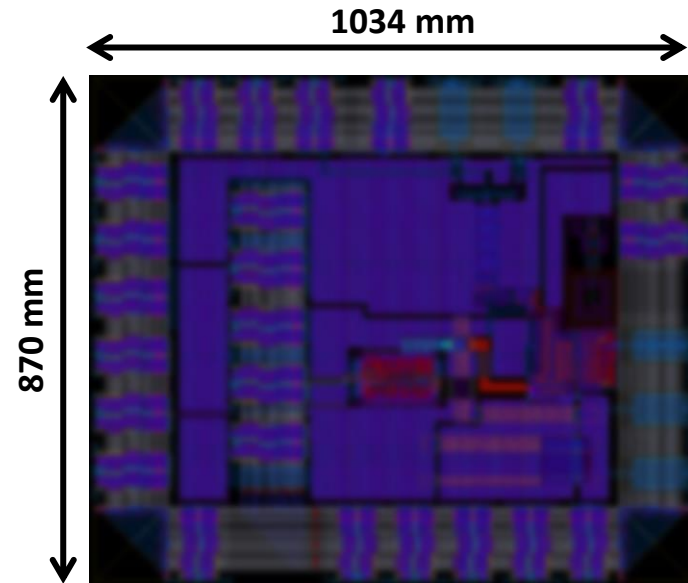
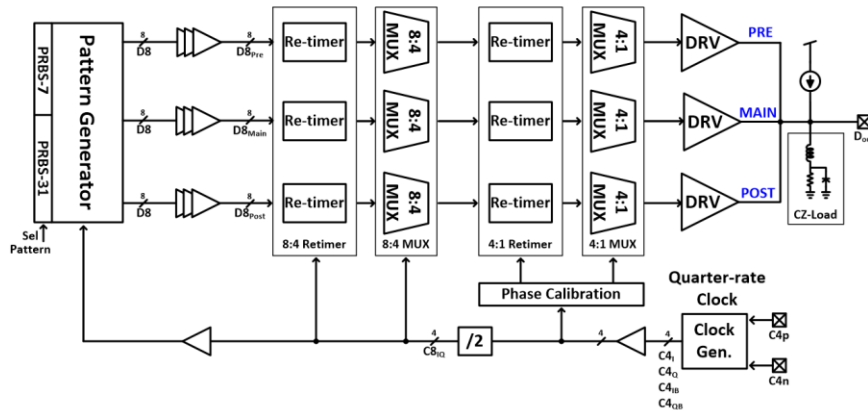


8ch 실험예정 @광운대

VCSEL Tx (SEC2505)

➤ NRZ/PAM-4 40Gbaud VCSEL (BW @14GHz) based OTX

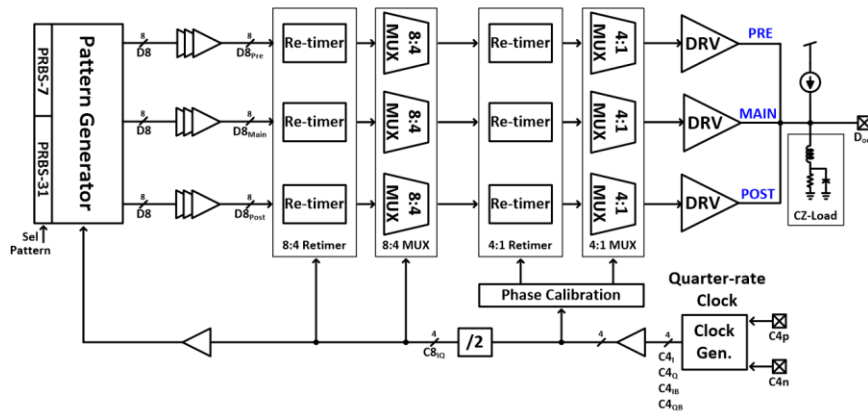
- ① 1-UI Spaced 3-tap De-emphasis (Pre, Main, Post1)
- ② Complex Zero CTLE



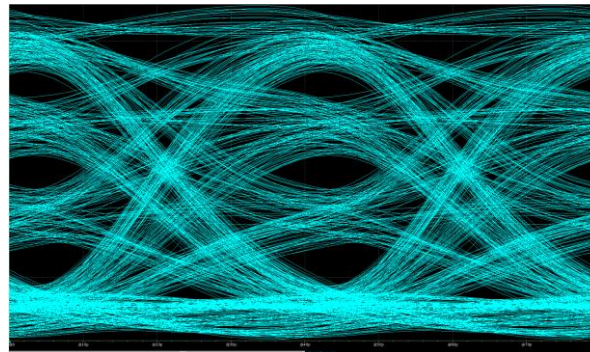
VCSEL Tx (SEC2601)

➤ NRZ/PAM-4 40Gbaud VCSEL (BW @14GHz) based OTX

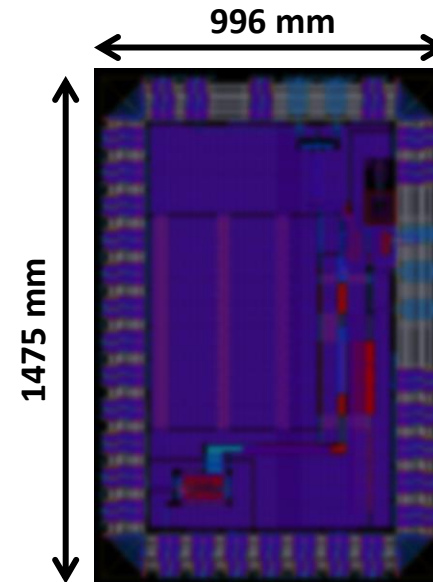
- ① 1-UI Spaced 3-tap De-emphasis (Pre, Main, Post1)
- ② Complex Zero CTLE



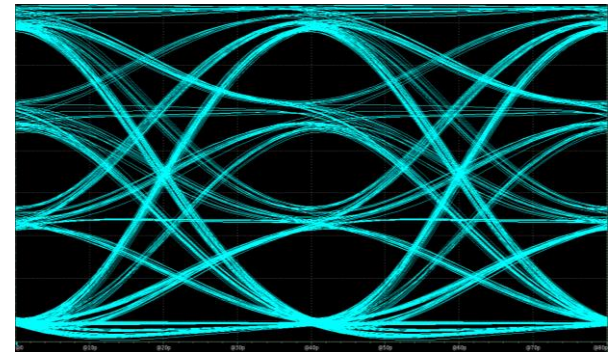
2505(simulated)



50Gbps



2601(simulated)



2026-1 ~ Plan

➤ Design

- MRM Tx IC (2026.7 or 2026.9)

➤ Measurement

- OPA calibration (2026.3)
- VCSEL Tx IC (2026.5)