

# Optical Fibers and Lasers for Co-Packaged Optics

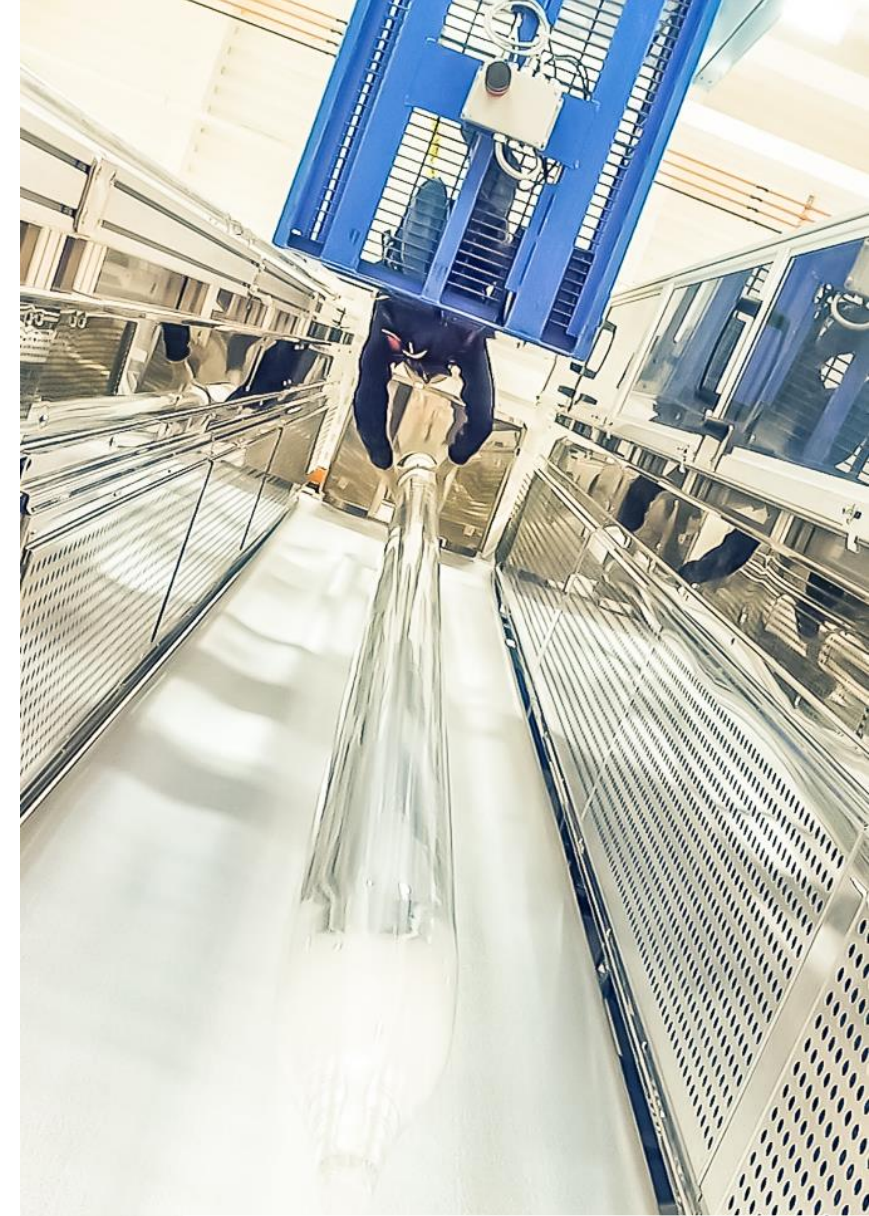
EPIC Online Technology Meeting May 23, 2022

# OFS: World-Leading Designer and Manufacturer of Optical Fiber Products

- Fiber preform design and manufacture
- Fiber draw and coatings
- Cable design and manufacturing
- Assembly design and fabrication
- Optical component design
- Certification and quality

John Earnhardt  
Director of Sales, OFS Specialty

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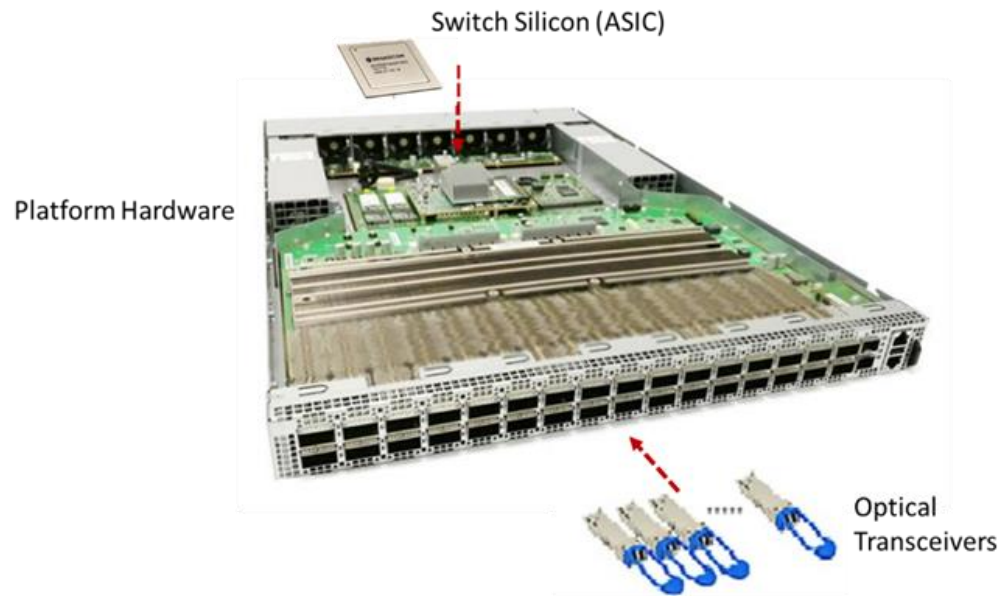
# Furukawa: World Leading Designer and Manufacturer of Telecom Lasers

- Laser chip fab in Chiba, Japan
- Laser assembly and packaging at Furukawa facility in Thailand
- DFB-based technology
  - For integration with SiP chips
  - For packaging into tunable lasers
  - For packaging in External Laser Source (ELS) module

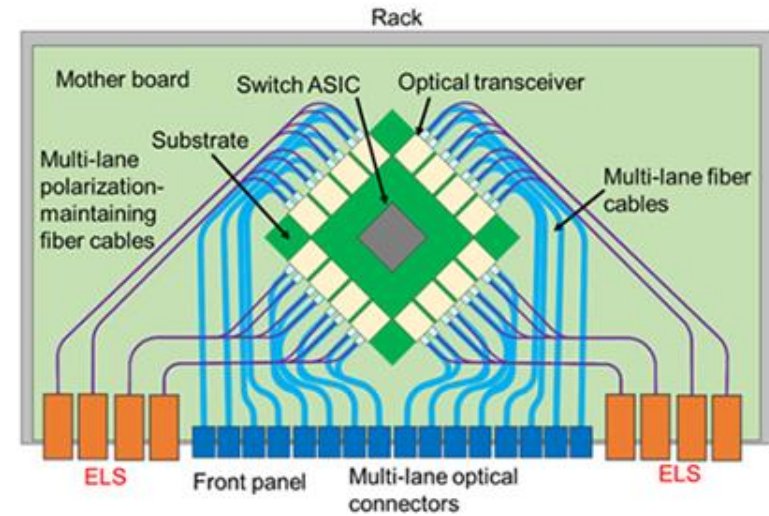


# CPO: New architecture to increase bandwidth at lower power consumption, and cost

From copper and pluggable transceiver

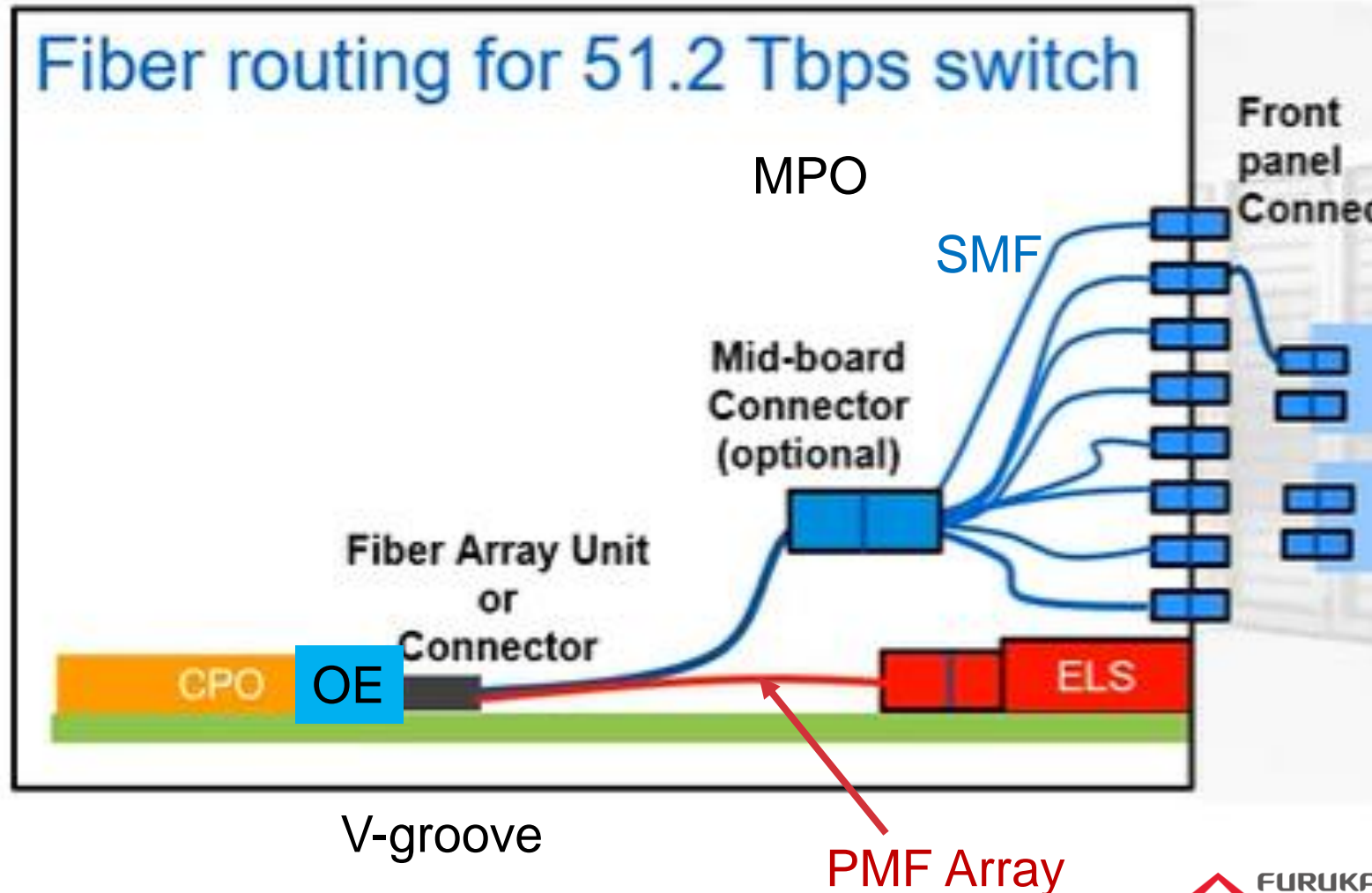


To fiber and pluggable external lasers





# CPO interconnect can include ribbons, v-grooves, ferrules, MPO connectors

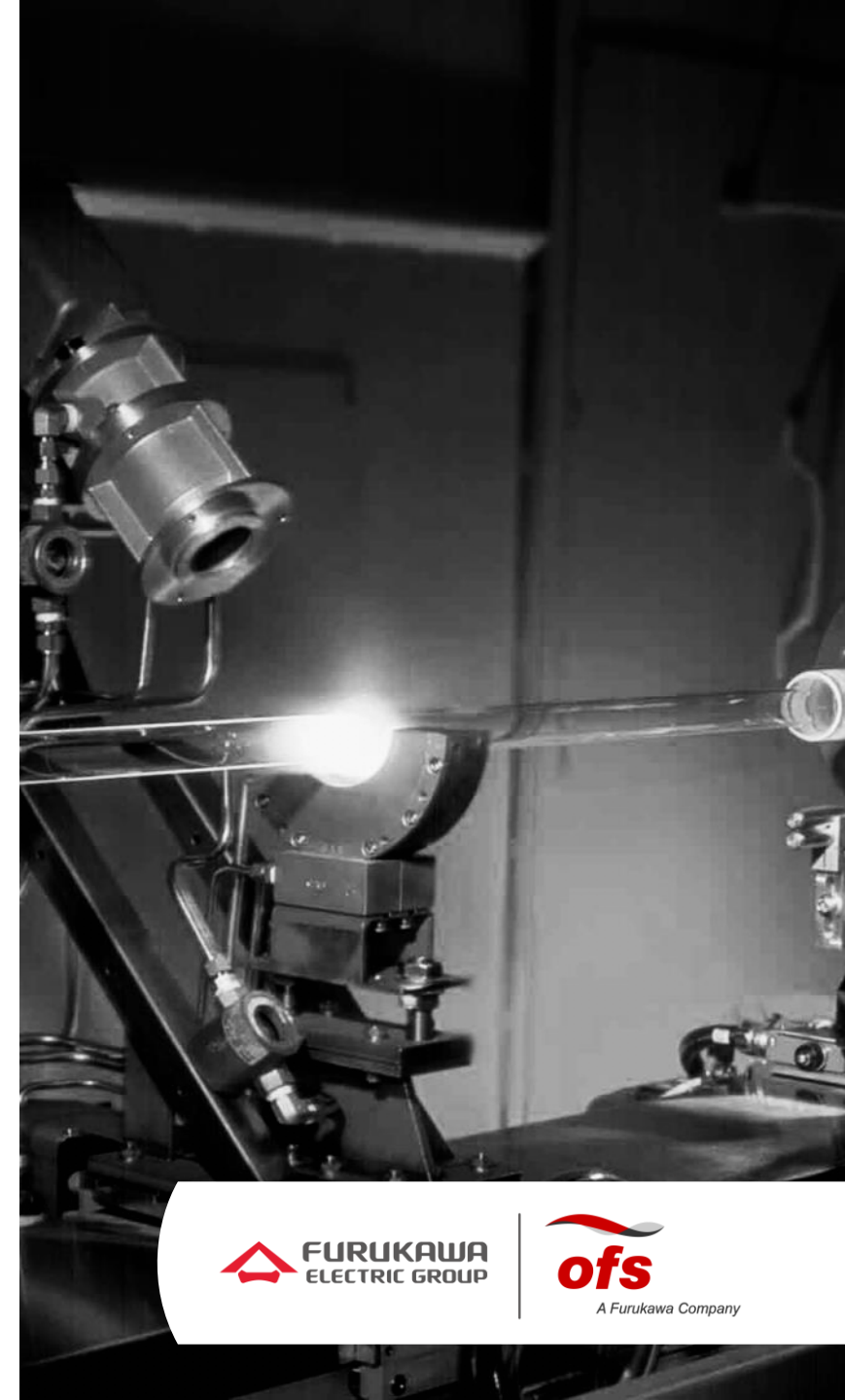


# Optical Fibers for CPO

- SMF and PMF
- Optical
  - MFD
  - Low bend loss
  - PMF (Beat length)
  - Multi-path interference
- Mechanical
  - Clad diameter (80 or 125  $\mu\text{m}$ )
  - Coating diameter (reduced diameter)
  - Tolerances on diameters; core/clad offset; stress rod alignment
  - Splicing

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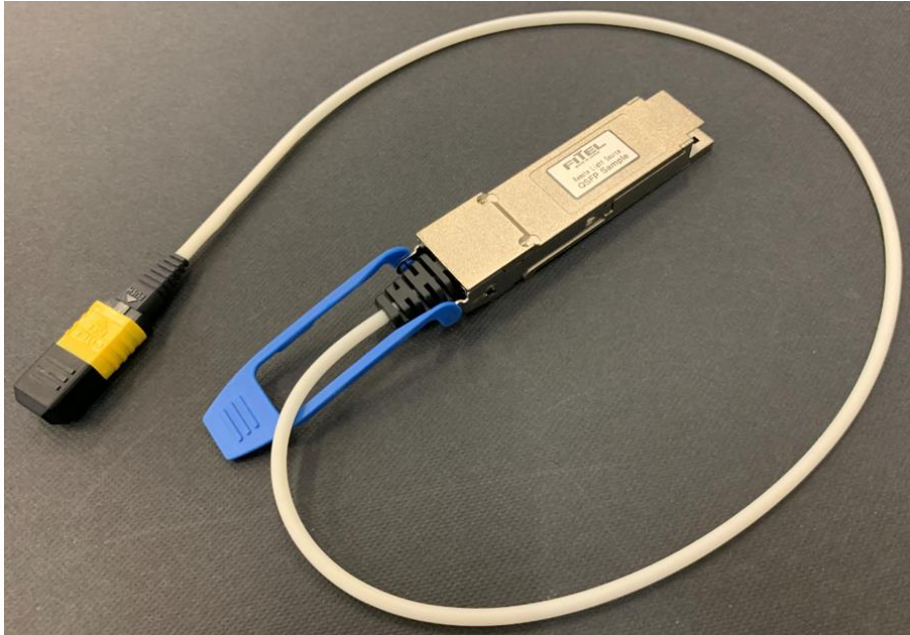


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# External Laser Source (ELS) for Co-Packaged Optics (Pigtailed QSFP ELS)

UNDER DEVELOPMENT



- 8-channel output
  - 4-l CWDM x 2
  - 1311 nm x 8
- Polarization maintaining MPO output
  - TE mode polarized output in the slow axis
  - Polarization extinction ratio: >20 dB
- Target Spec
  - Output power per channel: >100 mW
  - Case temperature range: 0-55 °C

# EPIC Represents a Great Opportunity to Collaborate

- CPO requires a new ecosystem of suppliers
  - Develop standards
  - Design and integrate new components
  - Scale production
- Furukawa and OFS offer a combined capability:
  - Active devices (lasers)
  - Passive components (optical fiber, arrays and connectors)
- We look forward to working together!





# Thank You

Any Questions?