ficonTEC eco-system for photonics packaging and testing
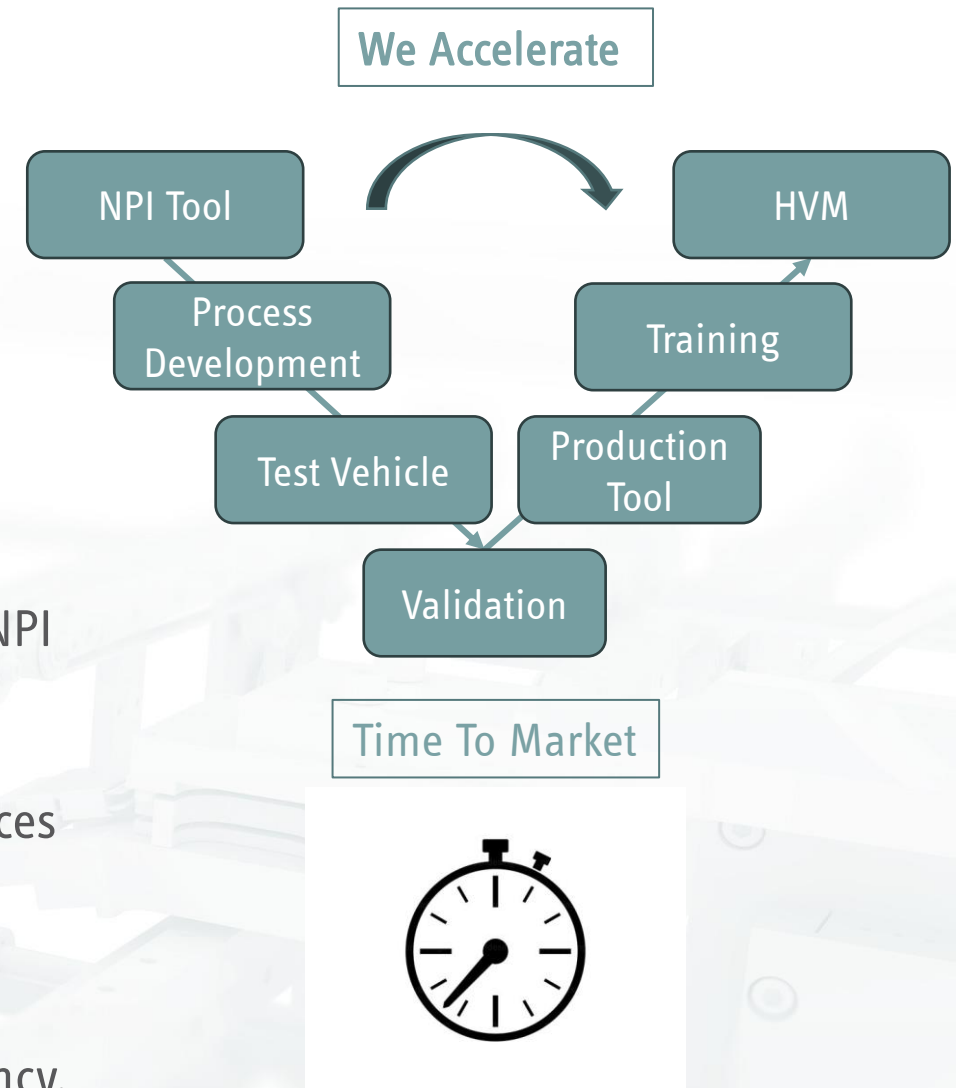
Ying Chen

ficonTEC Value Propositions

Over 23 years of leadership in photonics packaging and testing.

➤ **Proven NPI-to-HVM expertise** with top semiconductor companies –
scalable and efficient solutions.

➤ **Comprehensive capabilities**, including:
   o Precision passive and active alignments
   o Wafer level testing and packaging
   o Die-level testing and packaging

➤ **Unified API** across all platforms ensures seamless transition from NPI
to HVM, minimizing disruption and accelerating time-to-market.

➤ **Modular machine design** enhances spare parts management, reduces
maintenance costs, and lowers total cost of ownership (TCO).

➤ **High yield and throughput** performance optimized for maximizing
overall equipment effectiveness (OEE), ensuring operational efficiency.

We Accelerate

NPI Tool → HVM

Process Development

Training

Test Vehicle

Production Tool

Validation

Time To Market

ficonTEC's Total Solution From Wafer To Die

Wafer-level packaging process flow

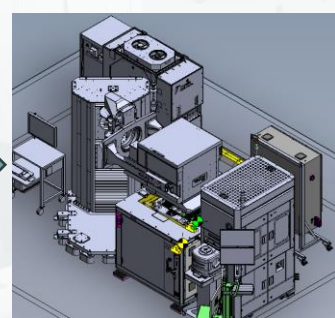Silicon wafer — Packaging — Dicing
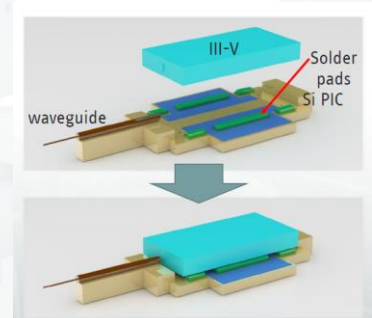
Wafer Level Testing
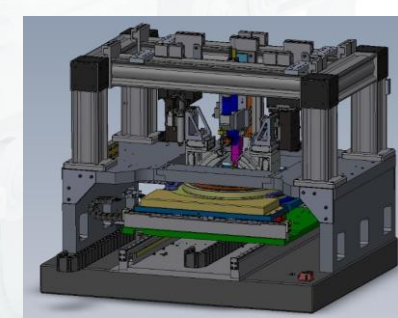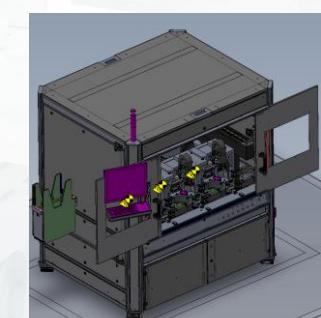
Wafer Level Packaging

Die Level Testing & packaging
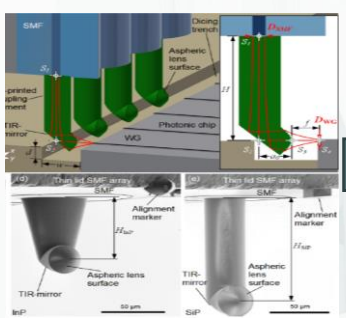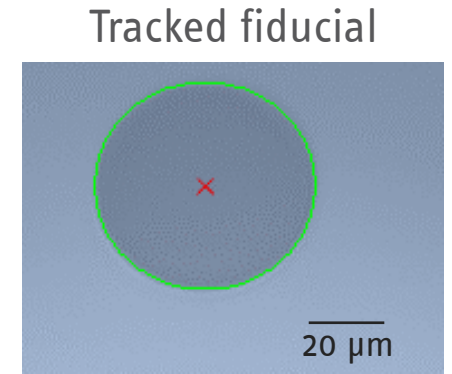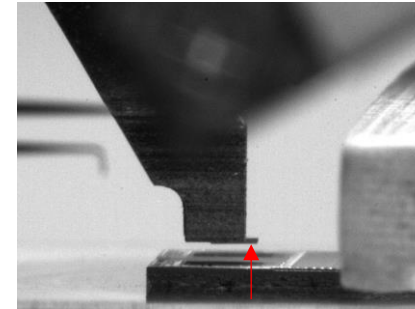

Single Sided Wafer

Double Sided Wafer

IR Bonding

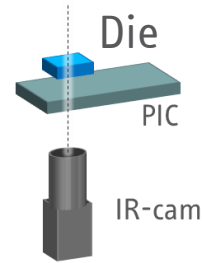Optics Attachment

Parallel Testing Process

IR Bonding-Heterogeneous integration

Die tracking through substrate

σ (x/y) = 0.07/0.06
3σ (x/y) = 0.21/0.18

Y-axis: Difference from Meanposition in µm
X-axis: Time in seconds

● X-normalized
● Y-normalized

Die
PIC
IR-cam

Tracked fiducial

20 µm
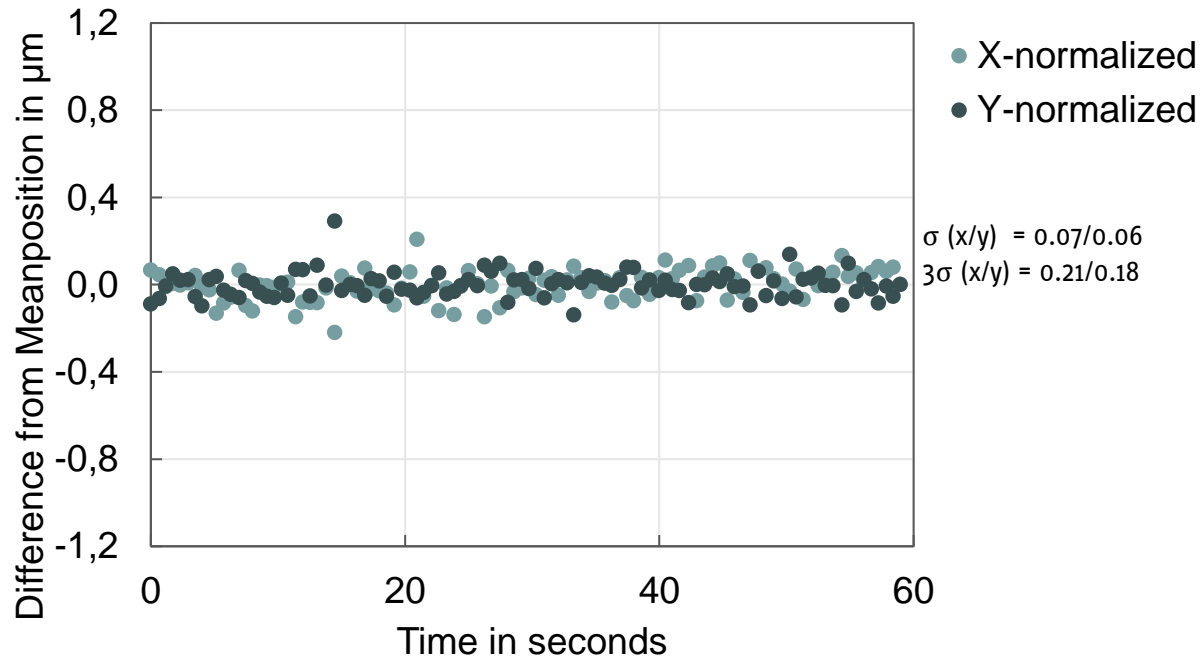
→ Accuracy of the fiducial tracking **through the substrate** is in the range of the aligner's accuracy
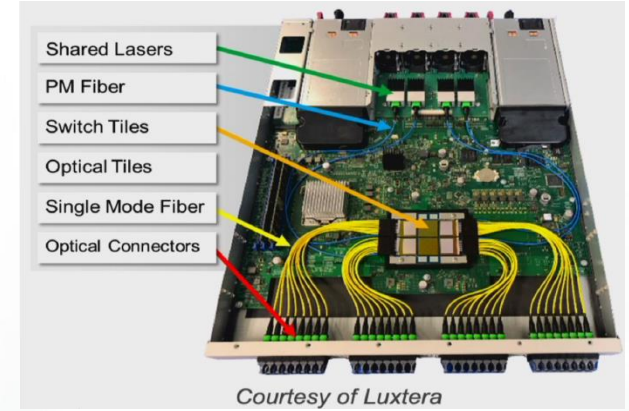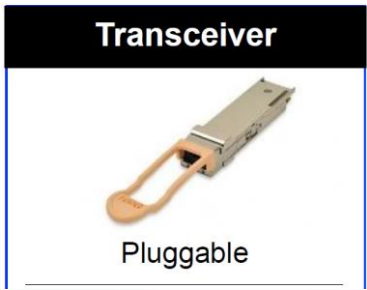
→ Targeted vision accuracy attained

Results:
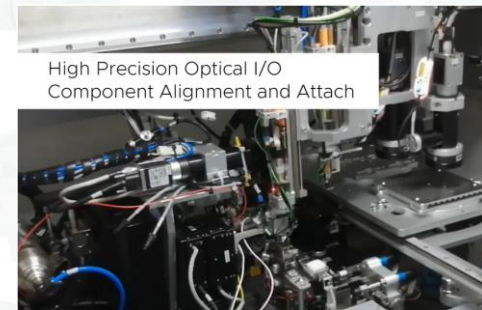σ (x/y) = ±0.07 µm / ±0.06 µm
3σ (x/y) = ±0.21 µm / ±0.18 µm

ficonTEC's Total Solutions From Pluggable To CPO

Transceiver

Pluggable

Shared Lasers
PM Fiber
Switch Tiles
Optical Tiles
Single Mode Fiber
Optical Connectors

Courtesy of Luxtera

Pluggable Tranceiver or ELS packaging

Packaging and Testing on CPO Level

Fiber stub with integrated lid

Fiber V-grooves on die

Die with nanophotonic circuits

High Precision Optical I/O Component Alignment and Attach
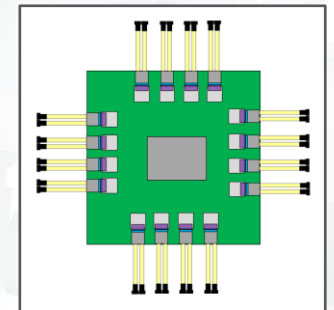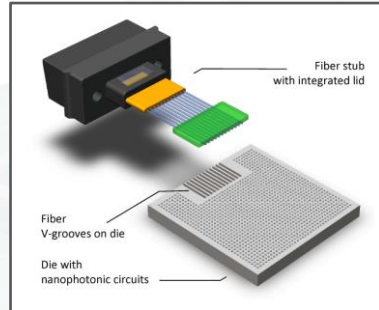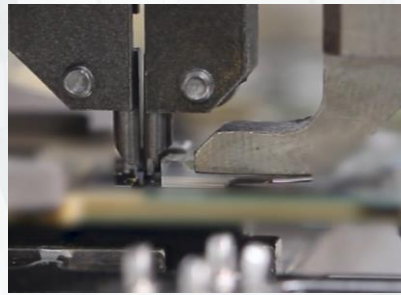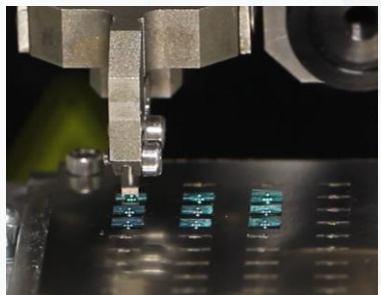
| Lens Attachement | FAU Attachment | FA V-Groove Attachment | Lens Array Attachment | CPO Level packaging |

FAU packaging-Ficontec line solution
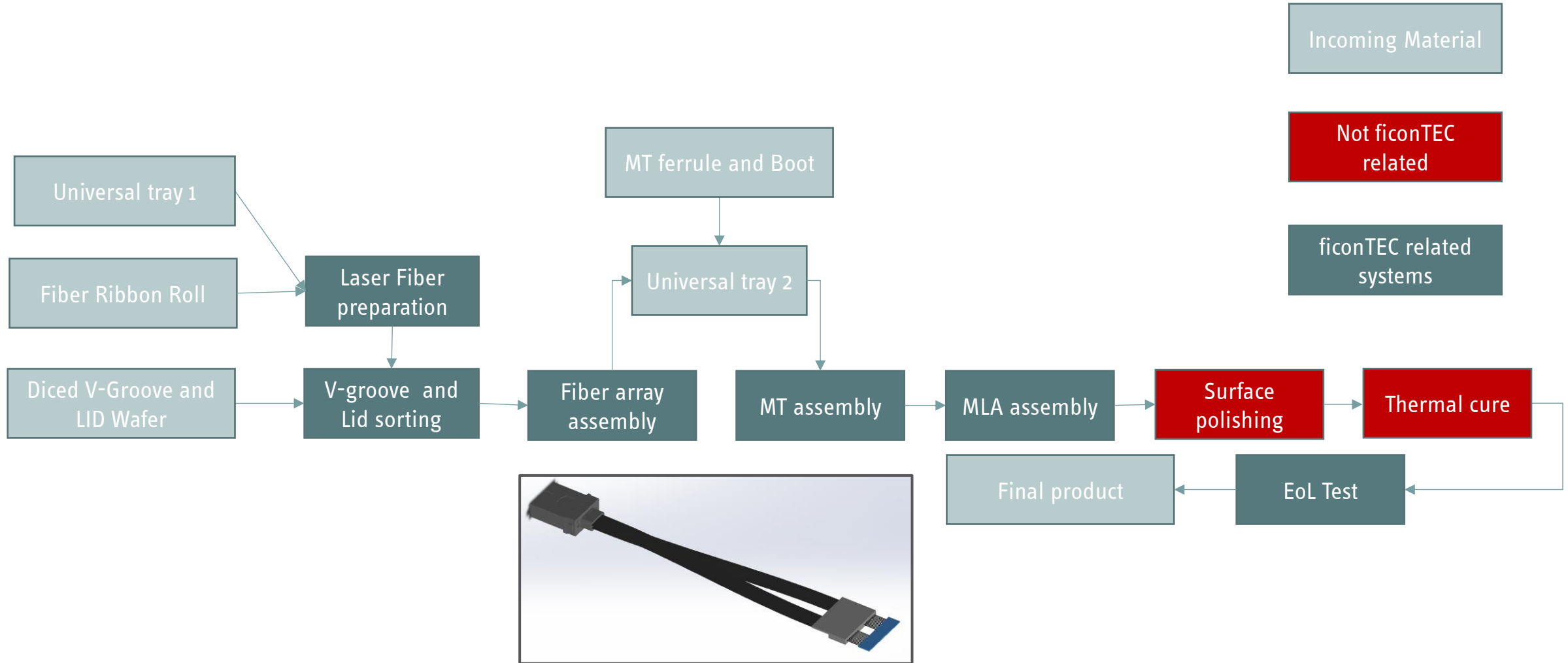
High Volume Manufactory (HVM) Solution

Automated Production System consisting of 1 Input Feeder; 1 System; 1 Output Feeder

Fully automated Production Line consisting of several Feeders, Passive and Active Attachment, EoL test and Laser marking

☑ SEMI S2 Certification

☑ SECS/GEM

Over 150 Machines for 1 Customer in 2 CMs
With 1 Application Software

AI/ML Enabled Software Solution

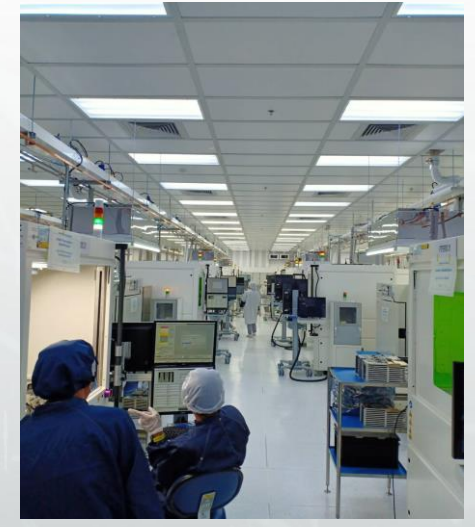## Example applications:

➢ Custom visualization for Process Parameters & Yield Monitoring

➢ Inline key parameters monitoring & alarm-Predictiveor Prescriptive Maintenance

➢ Inline optimization of motion parameter

➢ Machine learning-Active/Passive alignment improvement

➢ Inspection via Deep Learning

➢ Virtual system simulation tool (digital twin) to simulate all processes prior to hardware test.

Dashboards

AI /ML for process optimization
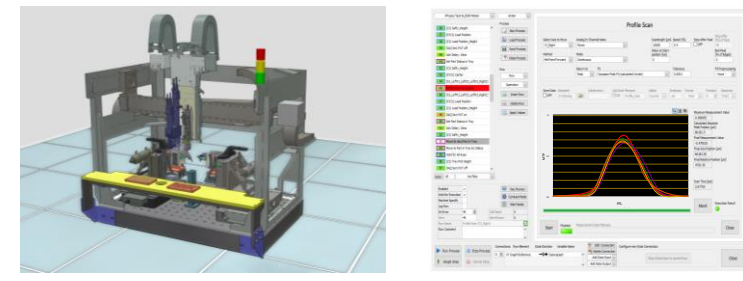
Digital twin

Global Presence

Germany HQ
Automation, R&D Lab

ficonTEC USA
Sales & Support
& Appication Labs

Ireland
MedTec &
Appication Labs

Estonia
Design Center

Suzhou Sales & Support
& Application Labs

Southern EU
Sales

Shanghai Sales

Taiwan Sales & Service

Thailand & Malaysia
Sales & Support

23 years of state-of-the-art photonics packaging & test.
Over 1400 systems installed and supported globally for
a customer base comprising *the* technology leaders
across Europe, Asia and N. America.

Application centers support customer development
and proof of concept

Q&A

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Sales Manager Asia Pacific & Indirect Sales

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If you got any further questions, let me know

Thank you!

Danke schön!

谢谢！