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Focuslight Overview

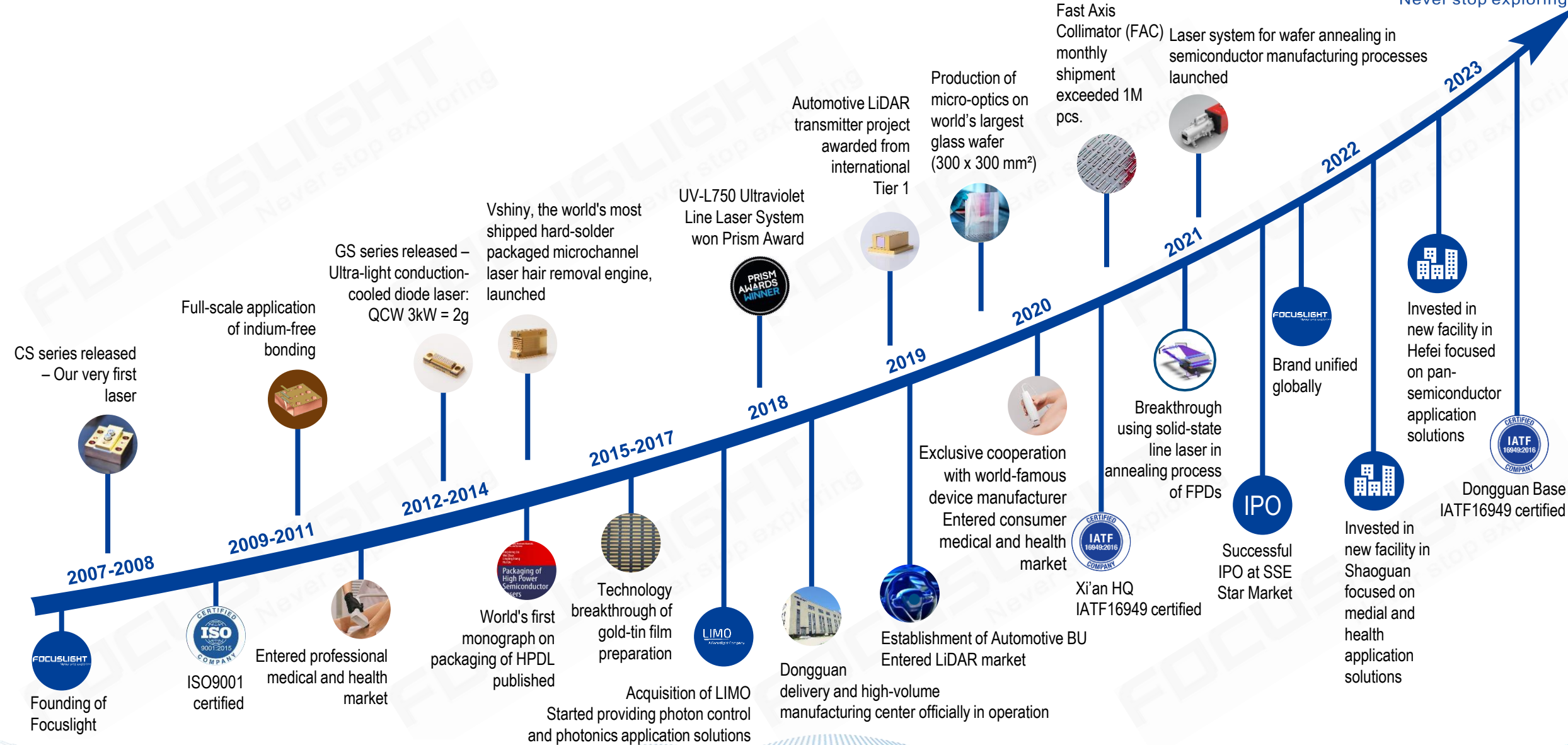
- Founded in 2007 by Dr. Victor X. Liu, headquartered in Xi'an, China.
- A fast-growing company that develops and manufactures **high-power diode laser components and materials** (photon generation) and **laser optics** (photon control) used in various industries and applications.
- Business scope is being extended by developing and manufacturing **photonic application modules, assemblies, and sub-systems** (photonics application solutions) with a focus on automotive, pan-semiconductor, and medical & health application solutions.
- In December 2021, Focuslight announced the IPO on the Shanghai Stock Exchange (Ticker Symbol: 688167).



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Milestones



Key Facts & Figures



Employees
>790



Yearly Revenue Proportion
Invested into R&D
~16%



Patents Valid
Worldwide
>430



Facility Building
Worldwide
>38,000m²



Clean Room
Worldwide
>10,000m²



ISO 9001
ISO 14001
ISO 45001
IATF 16949
Certified

Corporate Management Team



Dr. Xingsheng Liu (Victor)

Chairman & CEO

- Research and management experience in America (Virginia Tech, Corning, Coherent, nLight)
- 100+ publications, 300+ patents, 30+ invited papers internationally
- Committee Member of SPIE and IEEE, served or serving as chair or committee member of international conferences



Dr. Chung-En Zah
CTO

- 30+ years of research experience in America (Corning, Bellcore)
- 300+ publications, 50+ patents in optoelectronics and telecommunication
- IEEE Fellow, OSA Fellow, 2x R&D 100 award winner



Mr. Guowei Zhu (Gavin)

Corporate VP of Quality, President of Automotive BU

- Over 20 years experience in international automotive companies
- Rich plant P&L and operations management experience
- Familiar with IATF quality management system, KPI management, team building and plant operations management by World Class Manufacturing (WCM) & Lean manufacturing



Ms. Yiping Ye (Alison)
CFO

- Over 15 years management experience and multi-field business practices, familiar with LTC, IPD and intercultural cooperation
- In-depth understanding and rich operational experience in market development, project operation and business management



Mr. Ye Tian

Board Director, Corporate VP of Global Sales, China Sales Director

- Over 15 years' experience in market development, product marketing and sales
- Received the certificate of CEIBS' Leadership Acceleration Program



Ms. Xuefeng Zhang (Jennifer)

Board Secretary, Marketing Director

- 13 years photonics industry international business experience
- In-depth understanding and rich experience in sales, marketing and business development.



Corporate Management Team



Mr. Jinchao Qu

President of Diode Laser BU,
President of Medical & Health BU

- Extensive years of product marketing and sales management experience
- Outstanding track record in previous roles as Asia Sales Director and Head of the Application Systems Special Task Force

ALSTOM SIEMENS



Mr. Dirk Walter Bogs

President of Laser Optics BU

- Over 25 years' experience in ultra-precision tooling, optic manufacturing, engineering & project management
- More than 20 years' experience in operational management
- Very deep knowledge of technology development and optimization
- Experienced and familiar in international cooperation

LIMO
A Focuslight Company



Mr. Yong Tian (York)

VP of Laser Optics BU

- 20+ years of operation & R&D management
- Very deep knowledge with organic optical materials and optical coating technology, published SCI articles and owns patented technologies
- Experienced in Lean Manufacturing & Industry 4.0

IBM ZEISS

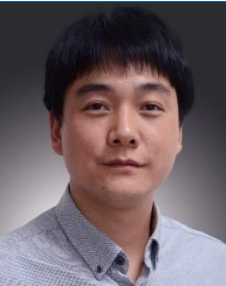


Mr. Yong Li (Leon)

VP of Automotive BU, VP of Business and Strategy of Laser Optics BU

- Outstanding leadership in previous roles: Overseas Sales Manager, Product Line Manager, and Head of the Automotive LiDAR Strategic Project
- Led the team to the successful automotive-grade SOP of the world's first all-solid-state LiDAR transmitter module
- Winner of Laser Focus World 2021 Rising Stars Award
- Experienced in international cooperation and strategic planning

Sumavision HUAWEI



Mr. Ye Dai (Robert)

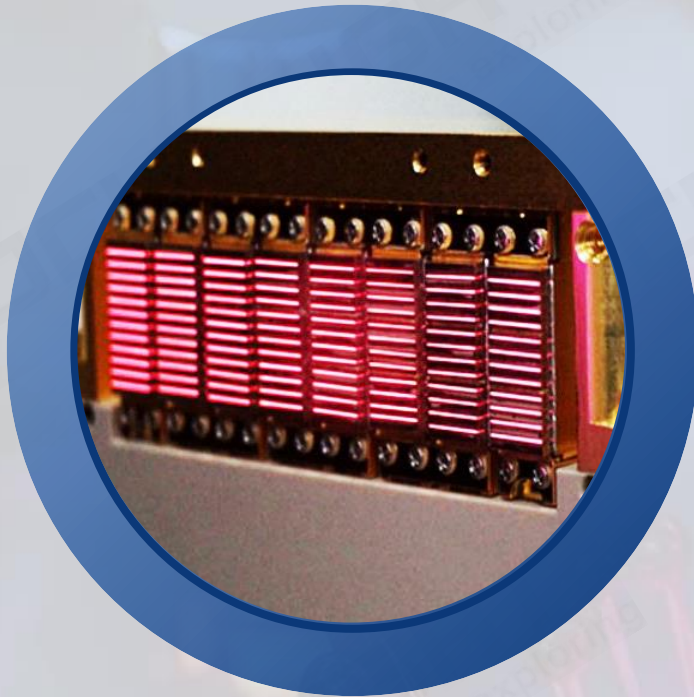
President of Pan-Semiconductor Solutions BU

- Excellent track record in worldwide sales & product line management leadership roles
- 20+ patents granted

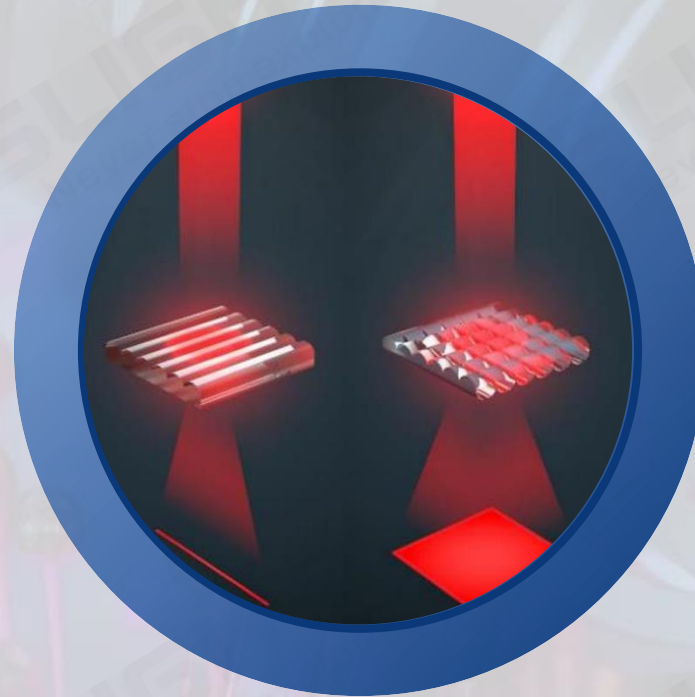
IVO APPLIED MATERIALS

Products and Businesses

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**Photon
Generation**



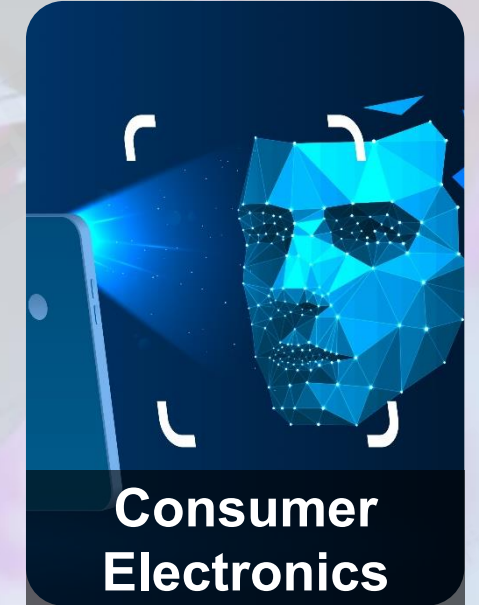
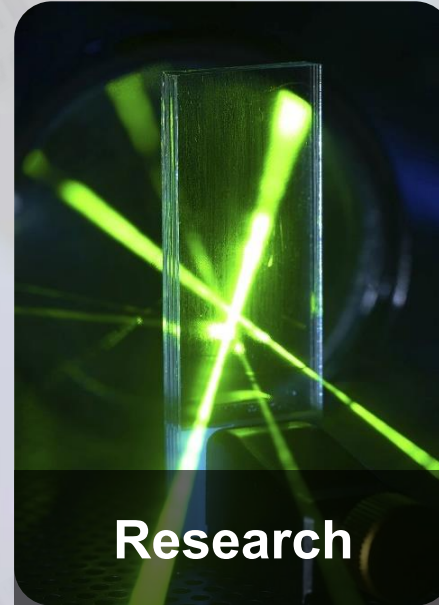
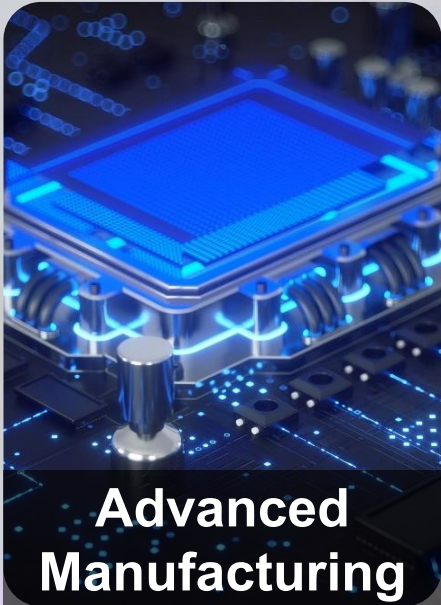
**Photon
Control**



**Photonics
Application
Solutions**

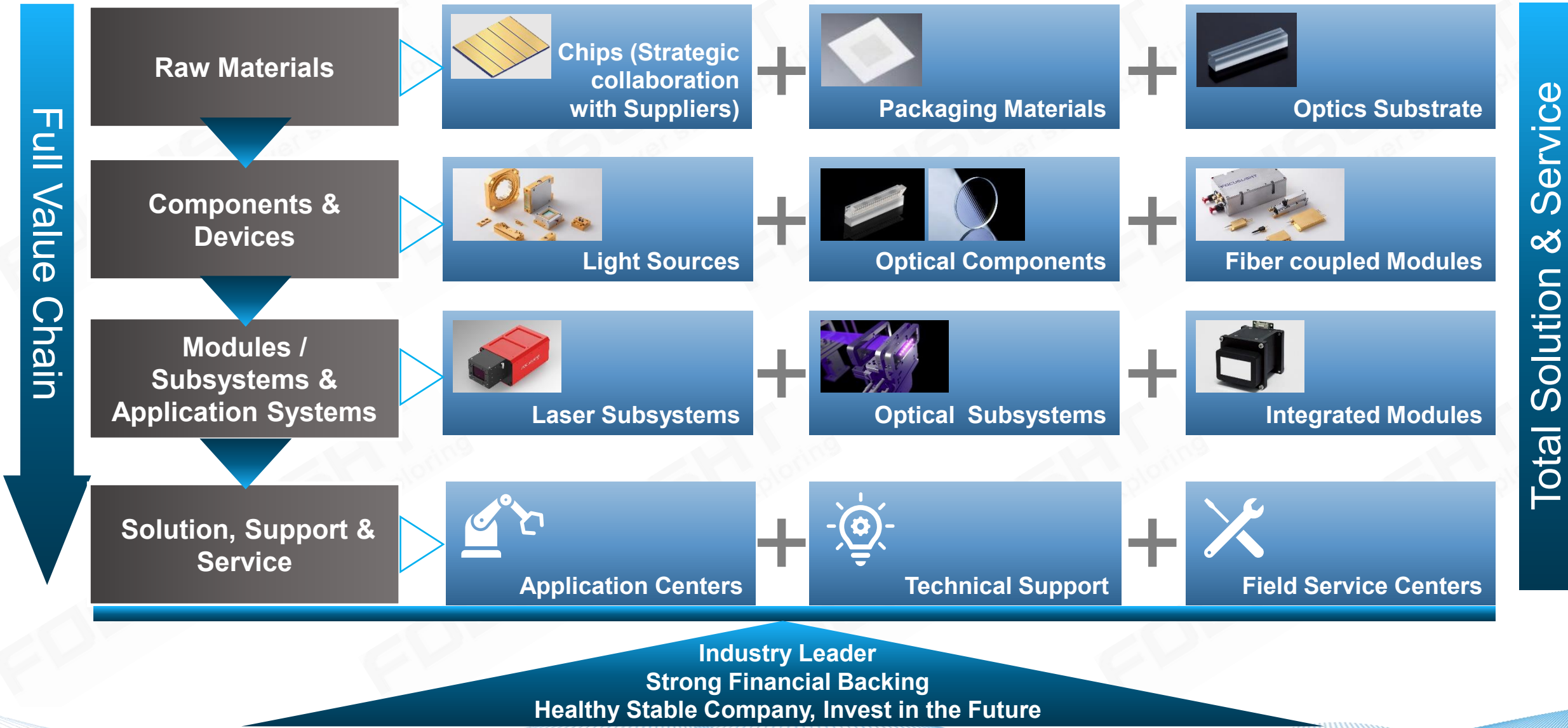
Markets

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**Be the global trusted photonics solution provider
through innovation, manufacturing excellence and fast response**

Value Proposition



Value Proposition



- ◆ **Quality First** philosophy



- ◆ Strong **IP position**



- ◆ Customer **commitment** and willing to **invest**



- ◆ Advanced **technical strengths** and **“know-how”**



- ◆ Extensive **engineering** capability and high-volume **manufacturing**



- ◆ **Low-cost production** ensured by high yield, low RMA & high productivity



- ◆ Comprehensive **quality assurance system including IATF 16949 Automotive QMS standards**



- ◆ **Full range of product portfolio** from components to modules or subassembly



- ◆ Application support and **total solutions**



- ◆ Versatile **customization service**

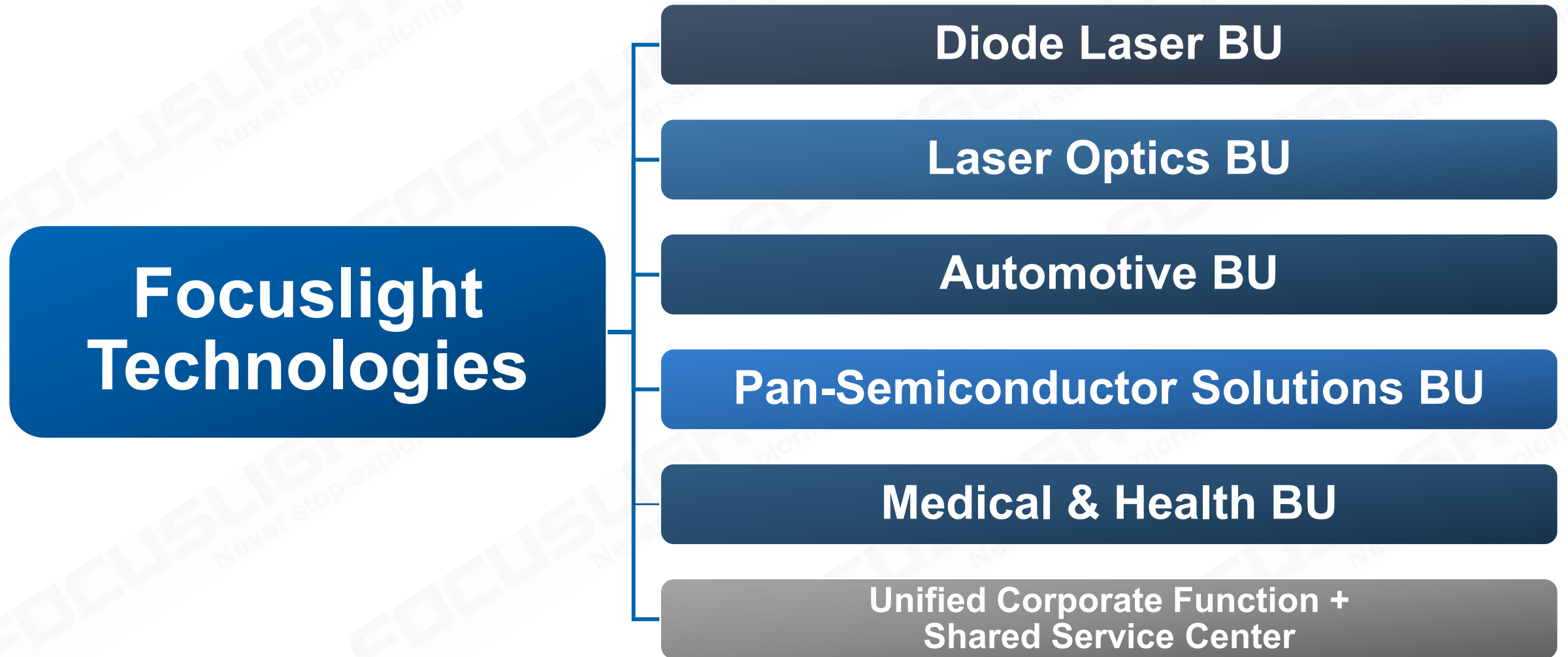


Vision

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**To unlock the potential
of photonics to enhance
and enrich people's life**

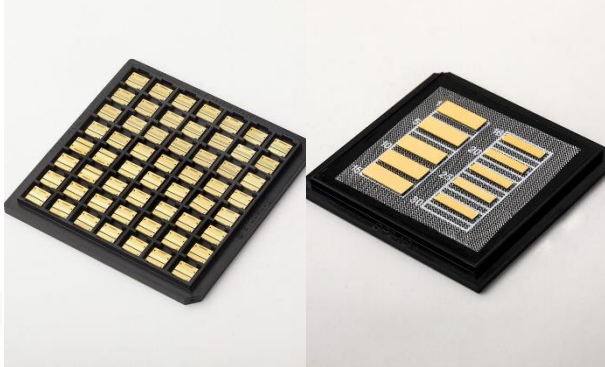
Company Organization



* BU: Business Unit

Products – Diode Laser Components and Materials

Advanced Materials



- AuSn Pre-Deposited AlN Ceramic Submounts
- AuSn Pre-Deposited CuW Submounts
- Thin Film Metallization Service

Active Devices



- Single Emitter Components
- Single Bar Components
- Micro-Channel Cooled Stacks
- Conduction Cooled Stacks
- Pumped Modules

Fiber Coupled Modules & Passive Components



- Emitter-Based FCM
- Bar-Based FCM
- Patch Cords

Professional Medical Application Components



- Laser Hair Removal Modules
- Medical Lasers

- Focuslight offers our customers a variety of products.
- Focuslight is committed to providing our customers with reliable, high-performance laser products and superior services

Products – Laser Optics Components

Single (A)cylindrical Lenses (SCL)			Micro Lens Arrays (MLA)		
Fast axis collimator (FAC)	Slow axis collimator (SAC)	Monolithic lens	Slow axis collimation array (SAC/TEL array)	Homogenizer (HOM)	Beam transformation system (BTS)

Precision Molded Optics (PMO)			Digital Optics (DIO)		High-Damage-Threshold Coating and Optics (HCO)	
Fast axis collimator (FAC)	Focusing lens	Lens array	Freeform polymer lens	Polymer diffuser	Micro prism	High-LIDT plano optics

Products – Automotive Application Solutions

LiDAR Tx F - Flash LiDAR Transmitter Modules

AL01 (Mass Production)



Auto-grade DPSSL

AT02 / AT02 Pro (Engineering Sample)



Auto-grade VCSEL module with wide FOV angles for DMS (Driver Monitoring System)

AX02 Pro (Engineering Sample)



VCSEL Flash Tx 700W

LiDAR Tx L - Line Beam Transmitter Modules

LE02 Pro

(Engineering Sample)



905nm 700W EEL
Line Beam Tx

LX02 (Engineering Sample)

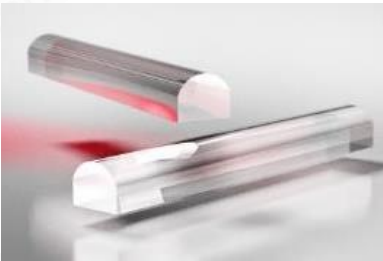


VCSEL Line Tx 1000W

LiDAR Tx OA - Optical Assemblies for LiDAR Transmitters

EEL FAC Collimators

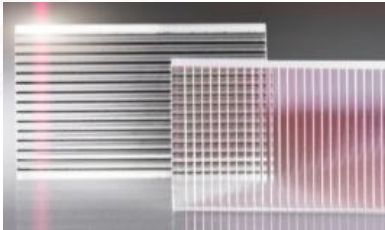
(Mass Production)



**LO BU Product*

Auto-grade Diffusers and Homogenizers

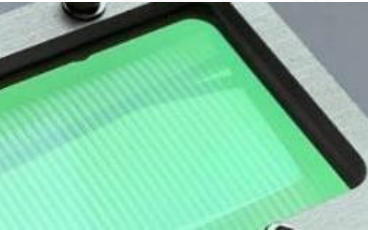
(Mass Production)



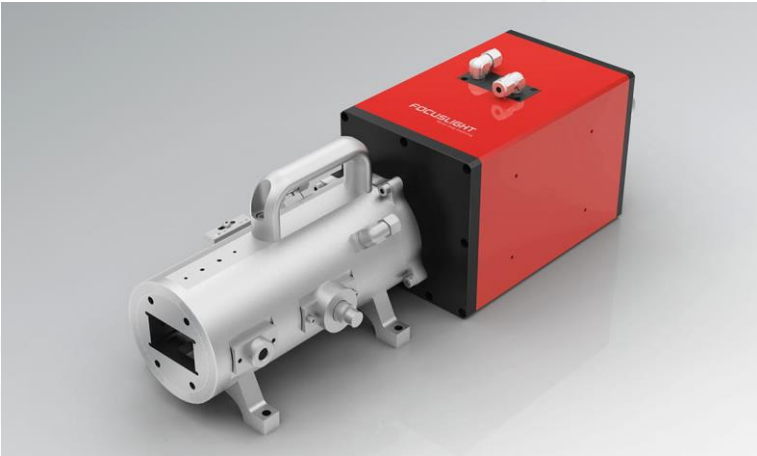
**LO BU Product*

Customized Optical Assemblies

(Engineering Sample)



Products – Pan-Semiconductor Application Solutions



IC Wafer Annealing System



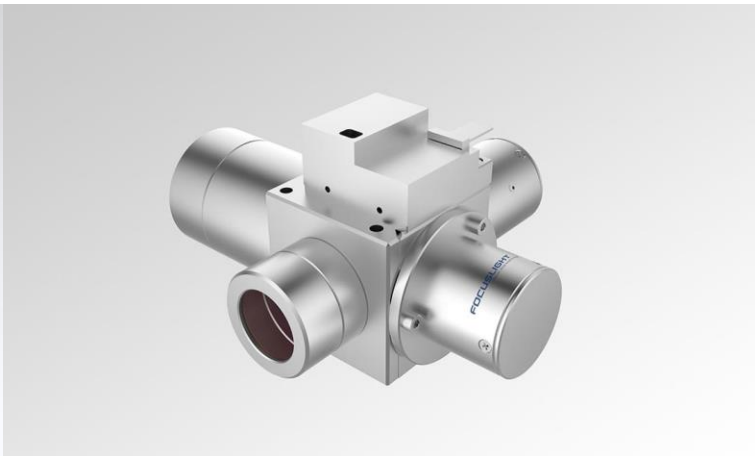
Variable Beam Laser System



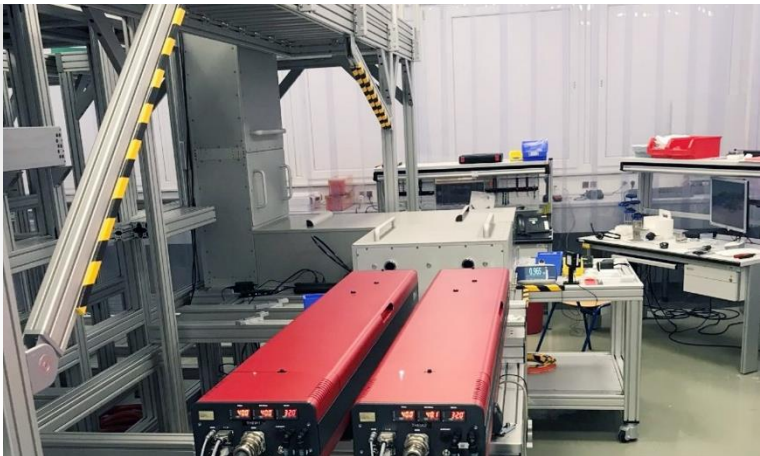
Solid-State Laser Lift-Off (LLO) System



IR Line System



Industrial Laser Modules



Solid-State Laser Annealing (SLA) System

Products – Medical and Health Application Solutions

Professional Medical & Health Modules

Laser Hair Removal
Module



Laser Body Sculpting
Module

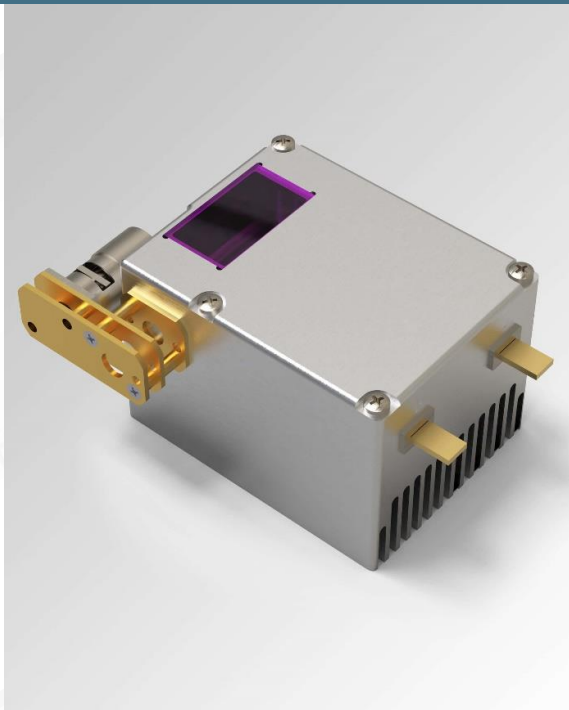


Consumer Medical and Health Modules

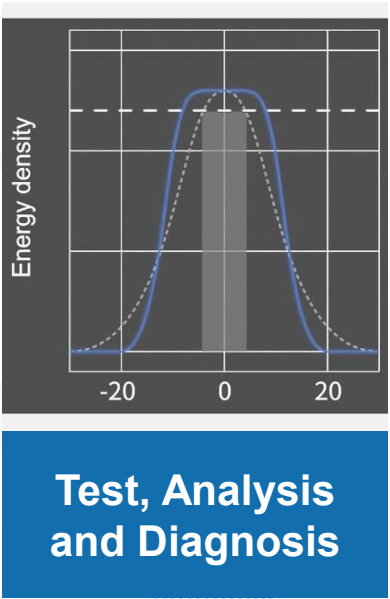
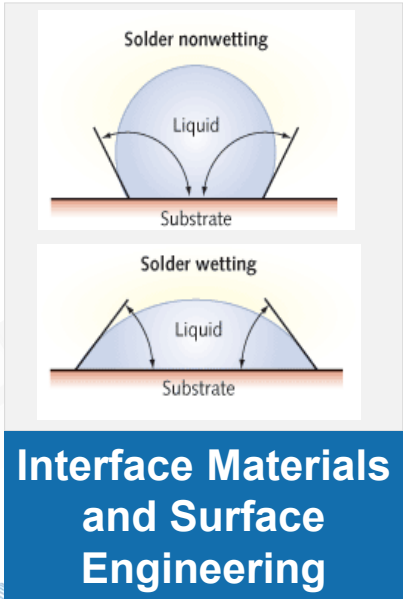
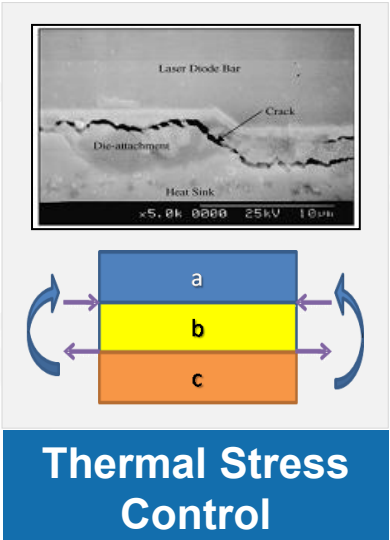
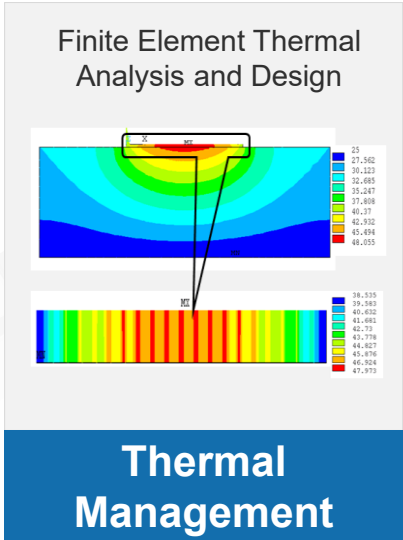
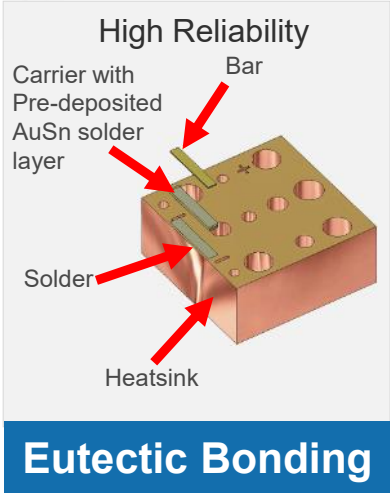
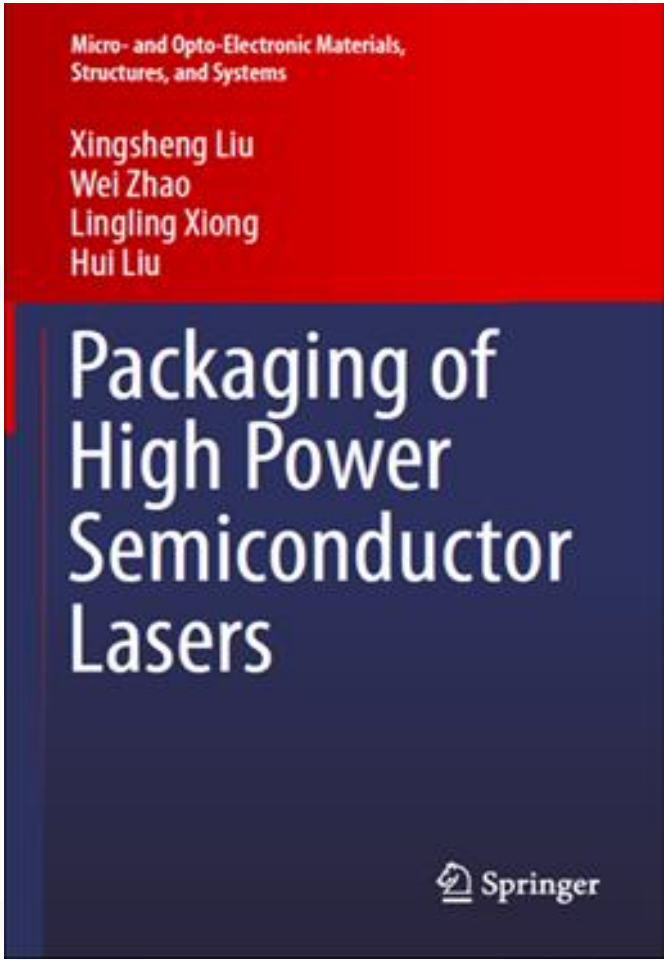
Home-use Skin
Rejuvenation Module



Home-use Laser Hair
Removal Module



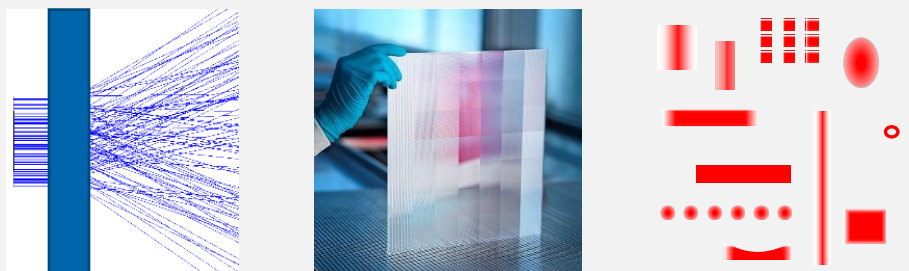
Core Competence – Diode Laser



Core Competence – Beam Shaping

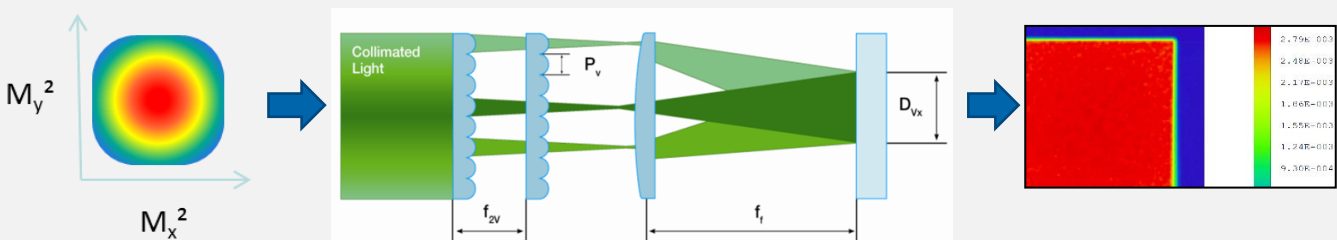
Micro Optics Design and Simulation

Acylindrical free-form micro-optics / arrays /
diffusers / DOE splitters / beam shaping systems



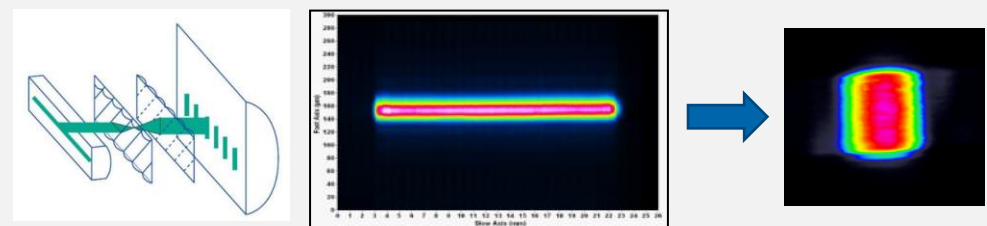
Homogenization

Uniform and homogeneous illumination in any desired shape

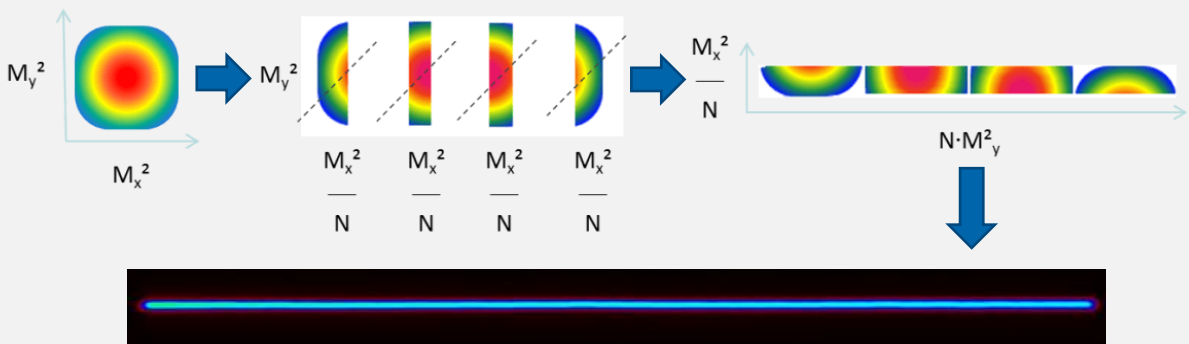


Beam Transformation

Asymmetrical → Symmetrical beam

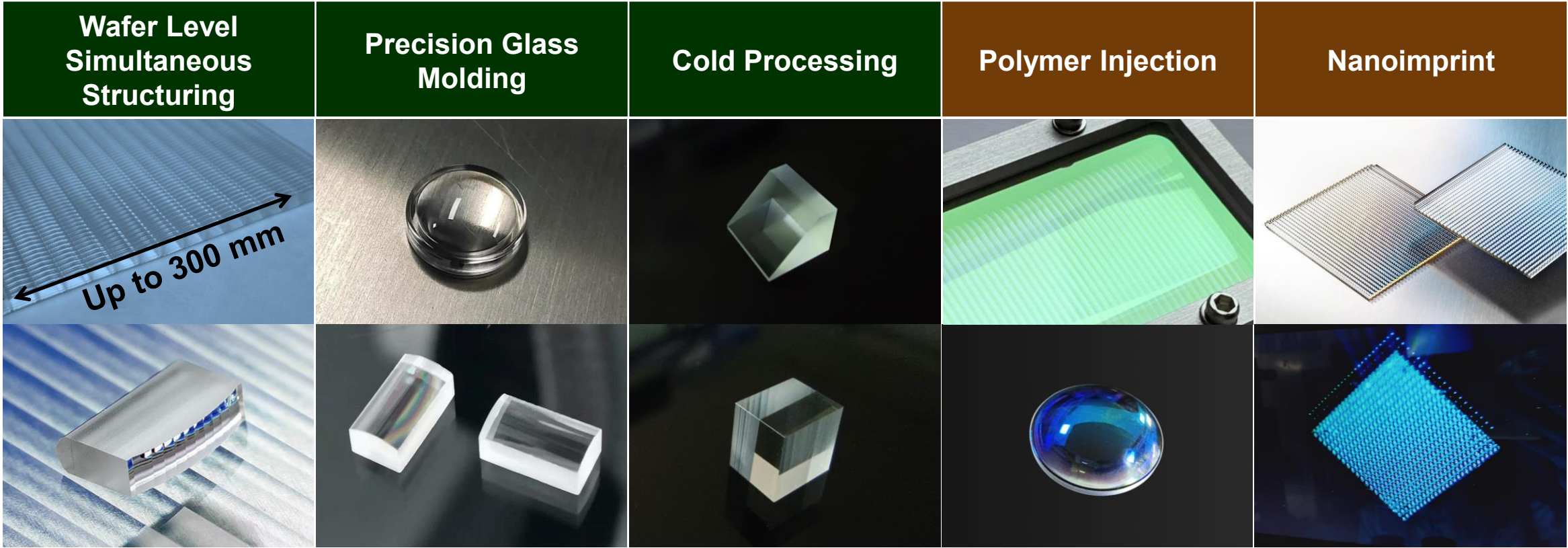


Symmetrical beam → High density line beam



The right photon at the right place and time!

Core Competence – Optics Manufacturing

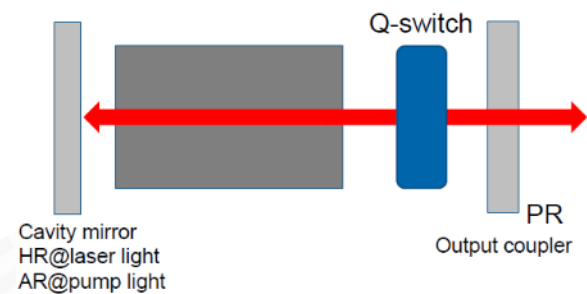


Inorganic material: Glass, Fused Silica, Silicon, CaF₂

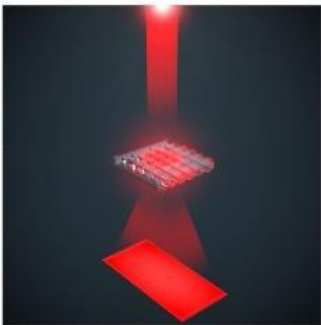
Organic material: Polymer, Polymer on Glass

High LIDT optical coatings available: Anti-reflection, high-reflection, beam splitter, band filter and various customization.

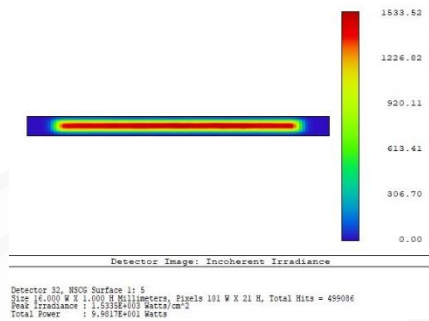
Core Competence – Automotive



Q-switch DPSS Laser Transmitter Design



Advanced ROE Beam Shaping Optics Design



Design and Simulation



High Power Diode Laser Design and Assembling



Automotive Grade Laser Design and Qualification



Optical Assembly Automation



Laser Testing and Characterization



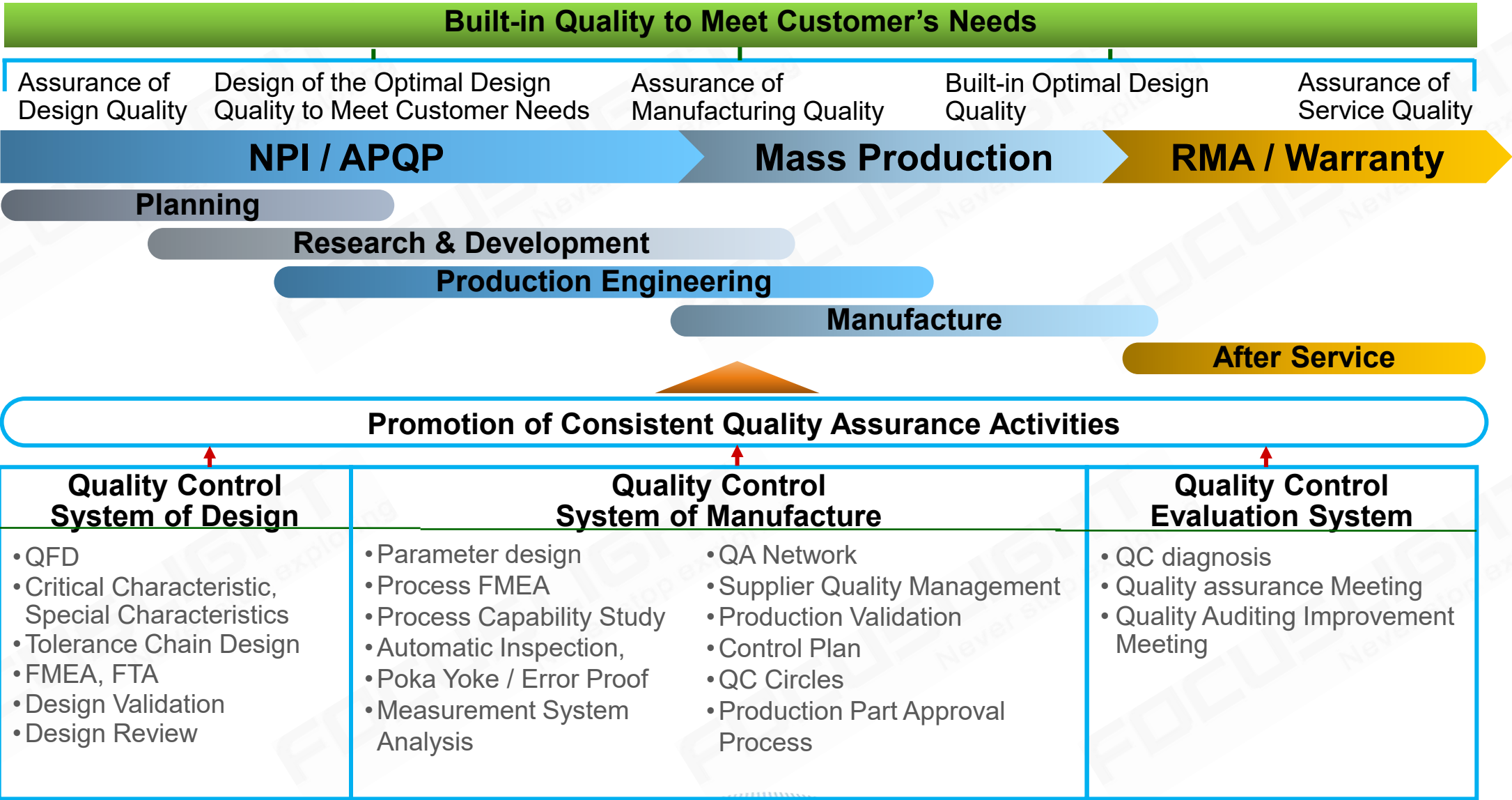
Laser Assembly Automation

Quality & EHS Management Systems

- ISO9001 Certified Quality Management System (QMS)
- ISO14001 Certified Environmental Management System (EMS)
- IATF16949 Certified Automotive Quality Management System
- ISO45001 Certified Occupational Health and Safety Management System
- Failure Mode and Effect Analysis (FMEA)
- Statistical Process Control (SPC)
- Production Traceability Database
- Control Plan (CP)

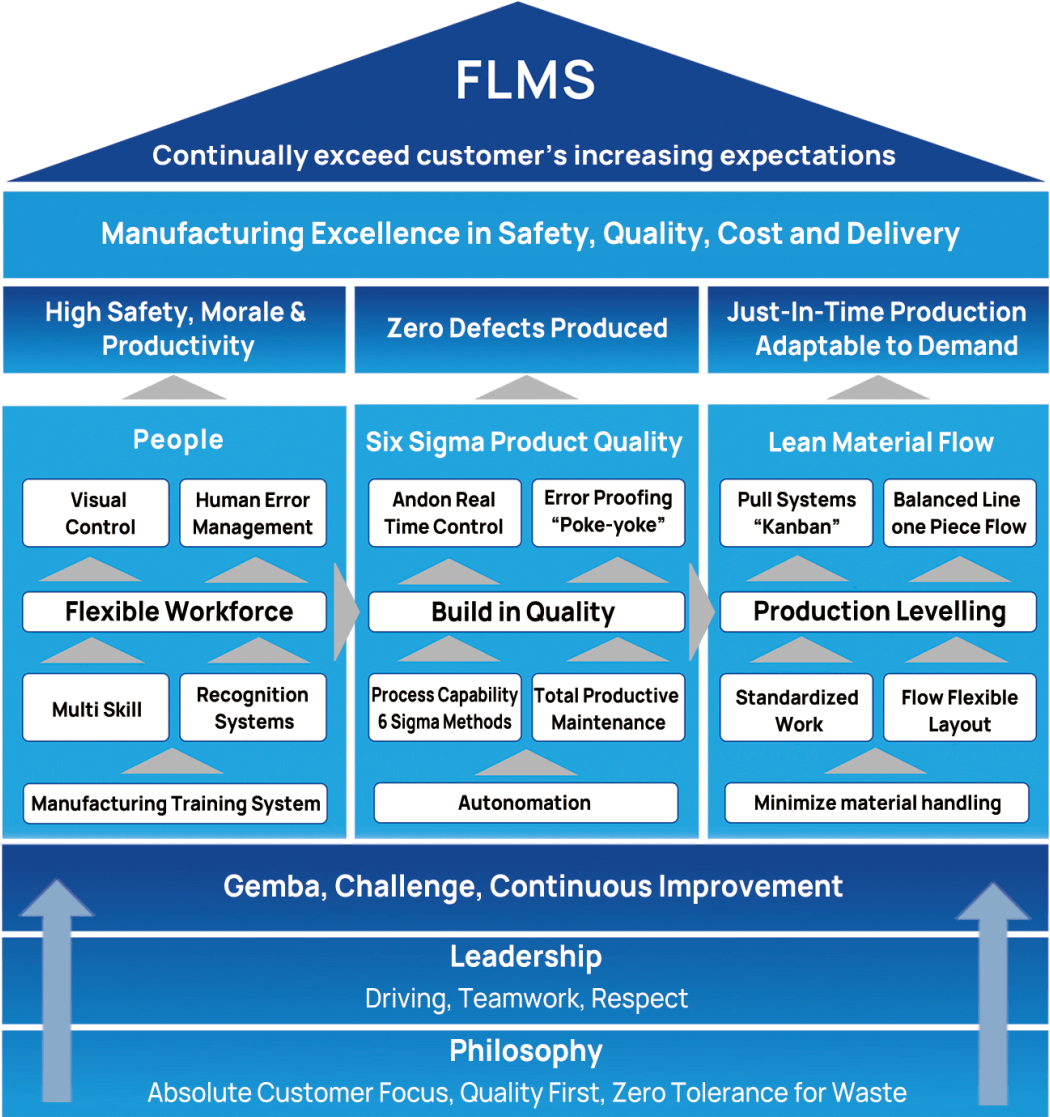


Quality Assurance System



Focuslight Manufacturing System (FLMS)

Focuslight Manufacturing System (FLMS)



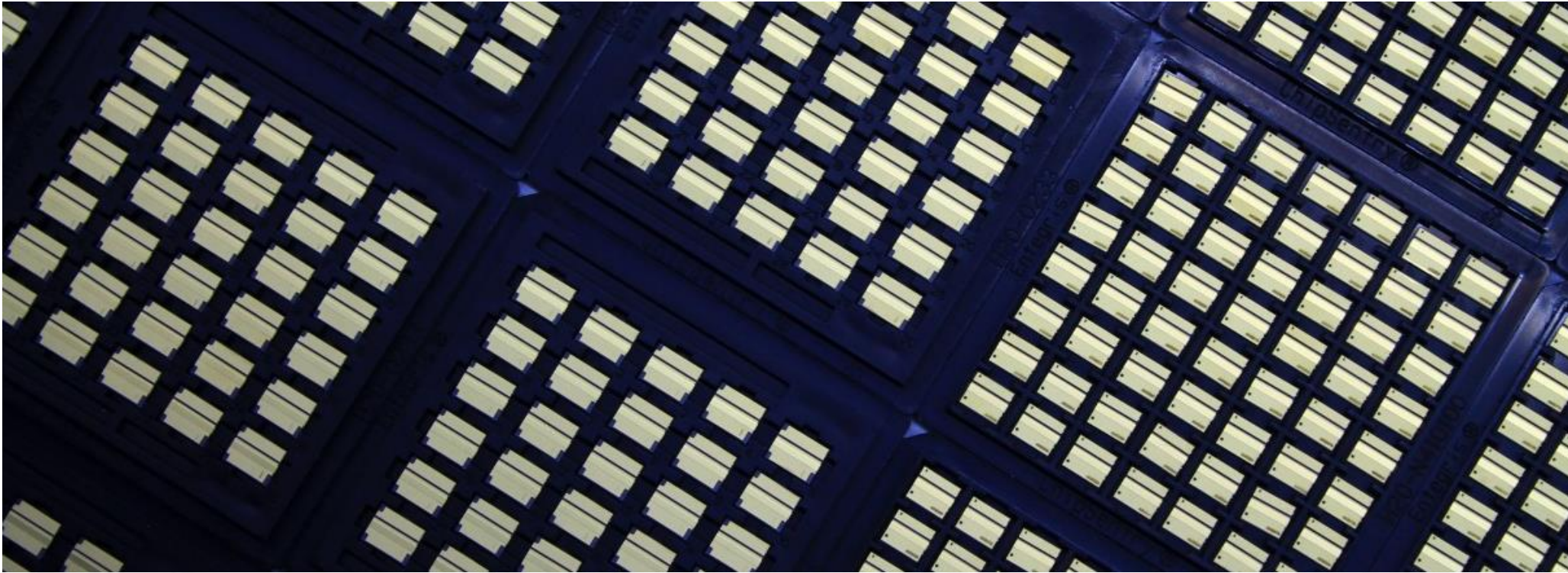
Manufacturing Excellence

- Apply the **lean manufacturing practices** to all production lines, including automotive, diode laser ones and laser optics business
- **Absolute customer focus, zero tolerance of waste, and continuous improvement** philosophy
- **Significantly reduced** cycle time, improved manufacturing efficiency, and lowered RMA yield and manufacturing cost.
- Adopting **automation and advanced production management system**
- **SOP** of the first LiDAR transmitter project with an international automotive tier 1 customer
- IATF 16949 certified and VDA 6.3 audited



Manufacturing Capacity – Advanced Materials

10+ years high-volume manufacturing experiences + self-owned core technologies



Monthly Advanced Materials Manufacturing Capacity > 2M pcs

Manufacturing Capacity – Diode Laser Components

Packaging & Assembling



Optical Assembling



Testing & Measurement



Quality Inspection

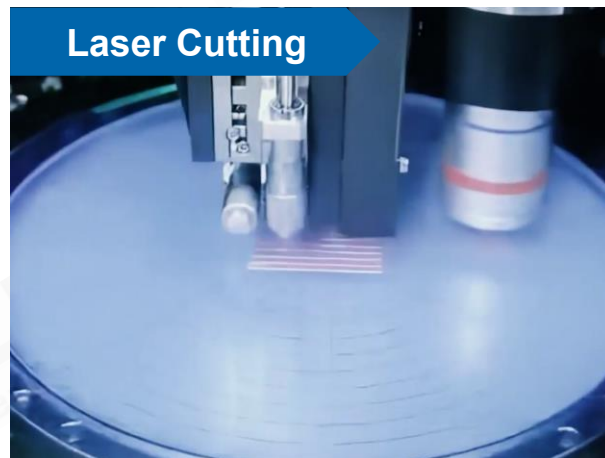
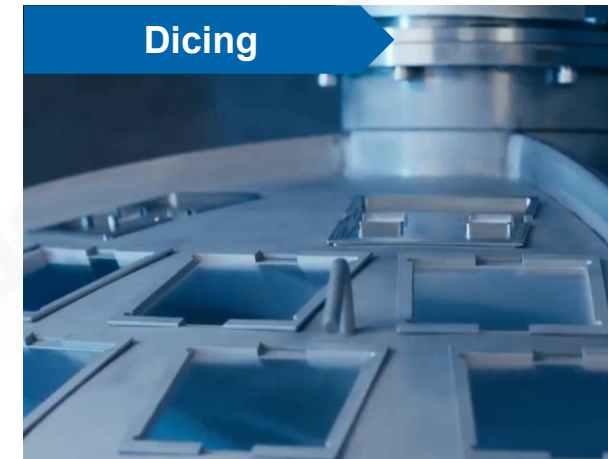
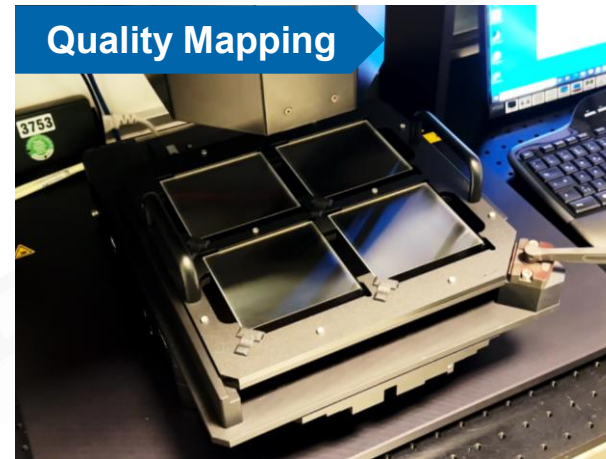
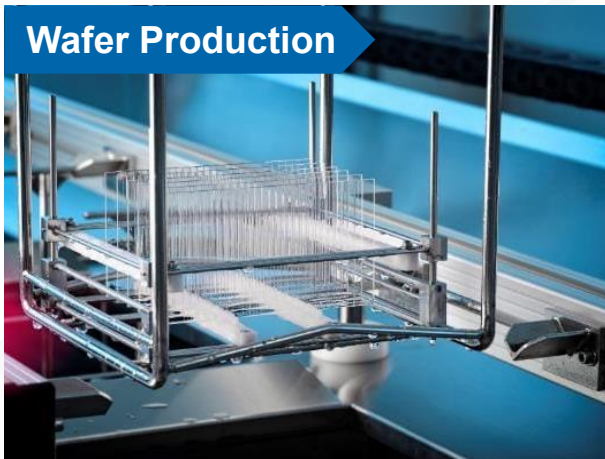


Burn-in & Lifetime Test



Yearly Diode Laser Manufacturing Capacity > 500K pcs
Burn-in Capacity 600K pcs/year

Manufacturing Capacity – Laser Optics Components

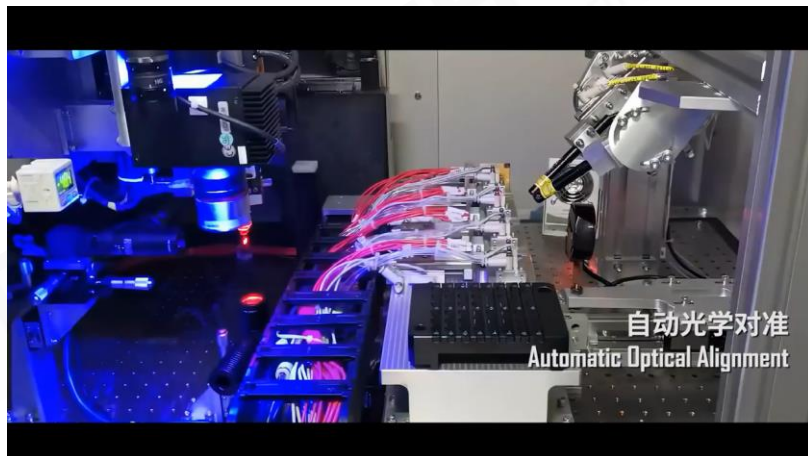


Monthly Micro Optics Manufacturing Capacity > 3 million pcs

Automation Powered Manufacturing Excellence

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Automatic Optical Alignment



Automatic Assembly



Laser Optics Production Line



LiDAR Transmitter Production Line



[YouTube link](#)

Global Facility/Capacity Expansion - China



Focuslight HQ, Xi'an, China

13787m² facility with 3710m² clean room space for **diode laser components & automotive LiDAR Tx module** production lines



Hefei, China

A new facility of ~25,000 m² focused on **pan-semiconductor application solutions** will be constructed.



Shaoguan, China

A new facility of ~15,000 m² focused on **medical and health application solutions** is being constructed



Dongguan, China

Total 65,000m² of building to be constructed. #1 and #3 buildings with ~6000 m² of clean room space has started operating in September 2022. Monthly **micro-optics** manufacturing capacity > 3 million pcs



Haining, China
UV-LLO and UV-SLA systems being fully deliverable from here

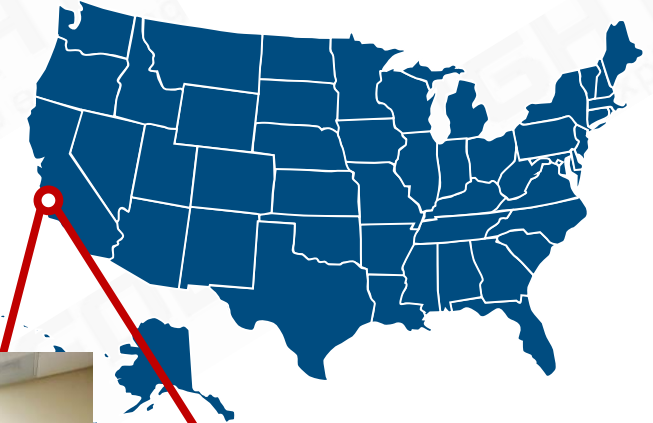
Global Facility/Capacity Expansion – Europe & USA

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Dublin, Ireland
EMEA Sales office and R&D staff being important parts of our global presence



St. Petersburg, Russia
R&D office with scientists supporting the R&D projects



Americas Sales Office
being an important part of our global presence

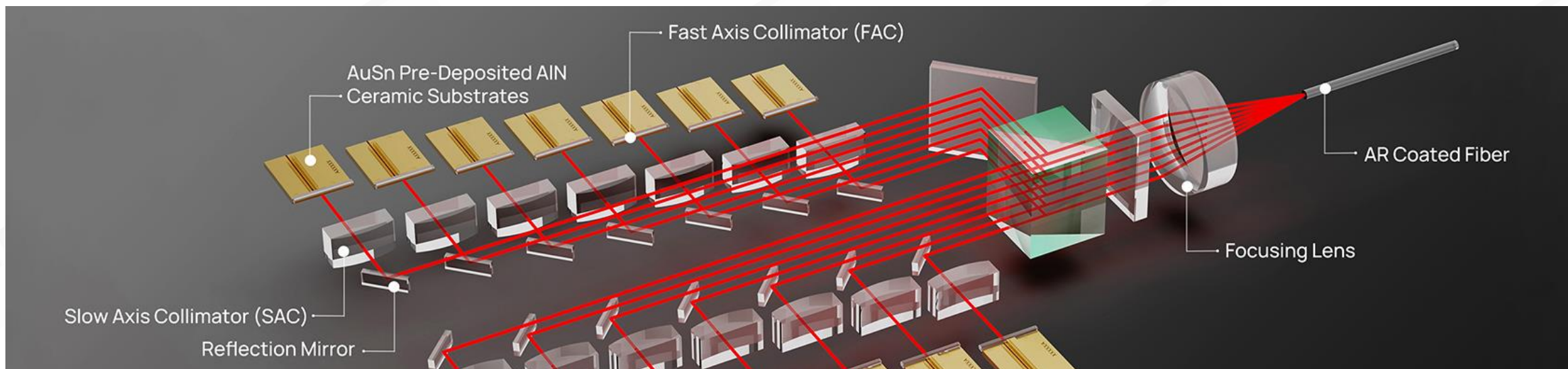


Dortmund, Germany
13000m² facility with 2870m² production area
Extension of **high-volume micro-optics wafer** production line (FAC /SAC) with manufacturing space increased by 150%
Expansion of UV laboratory finished



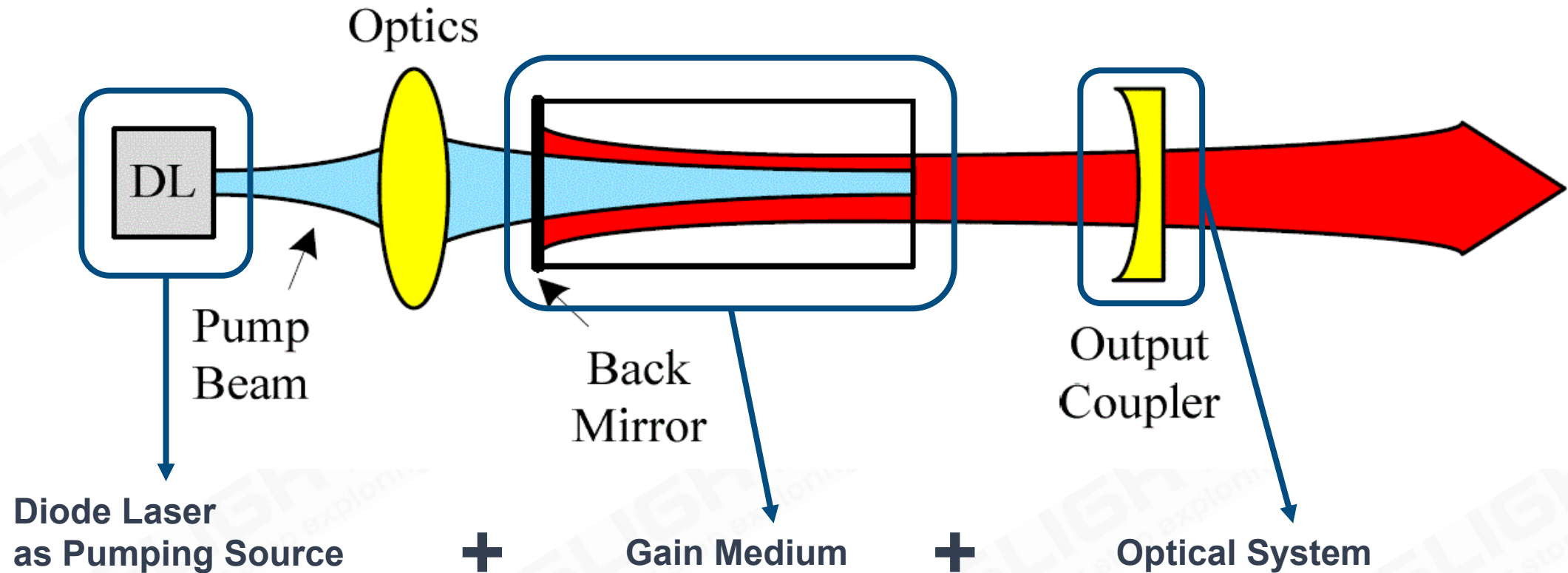
Silicon Valley, USA
The **new innovation lab** has been set up with our Chief Scientist working here

Applications – Fiber Laser Pumping



- **AuSn pre-deposited ceramic substrates** – stable and reliable thanks to the high thermal conductivity and suitable thermal expansion coefficient;
- **Fast axis collimators (FAC) and slow axis collimators (SAC)** – fundamental and efficient solutions for shaping the beam emitted by the pumping sources;
- **Reflection mirrors** – highly accurate and efficient in reflection, reducing optical signal losses;
- **Focusing lenses** – coupling the collimated laser beam precisely into the output fiber;
- **Optically coated fiber attached to the pumping sources** – transmitting the laser energy to the gain medium, enabling the function output of the fiber laser module.

Applications – Solid State Laser Pumping



Diode Laser: ↓ Footprint ↑ Reliability ↑ Efficiency ↓ Cost

Application – Health



- **Direct diode laser solutions** and **fiber coupled laser solutions** for medical and aesthetic uses including laser hair removal, laser body sculpting, dental, surgery, laser fluorescein angiography (LFA) etc.
- Strong positioning in **professional hair removal** industry worldwide
- Fast growth (>300%) in **consumer health solution** and **body sculpting** laser modules
- Massive production project awarded from world-class home-use aesthetic equipment manufacturer



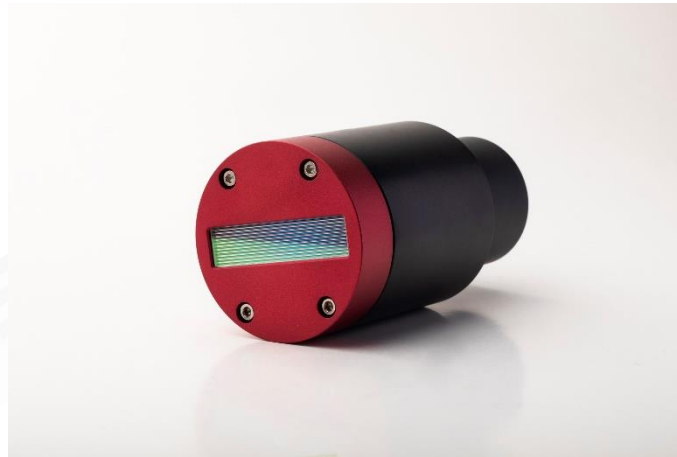
Applications – Cladding

- Dlight ® high power direct diode laser systems integrate diode laser stack and precision micro optical systems into laser head directly.
- High output power and optimized spot configurations are specially designed for big area treatment applications with high throughput and high surface quality.



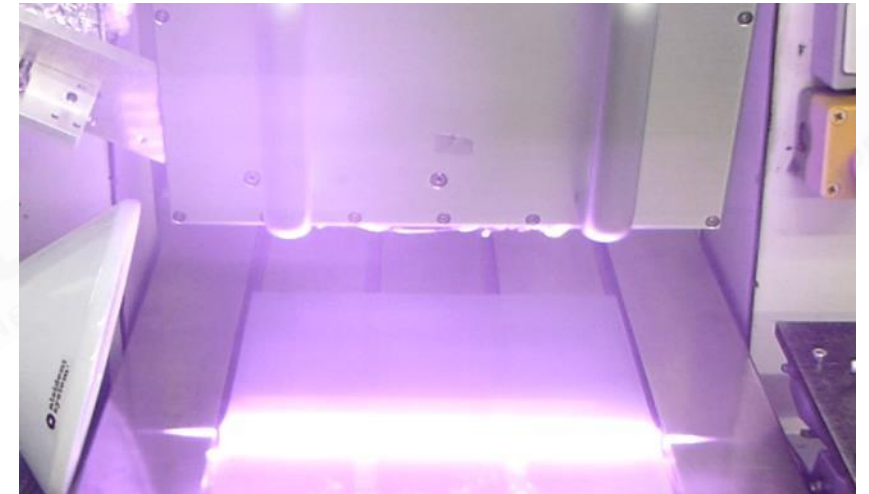
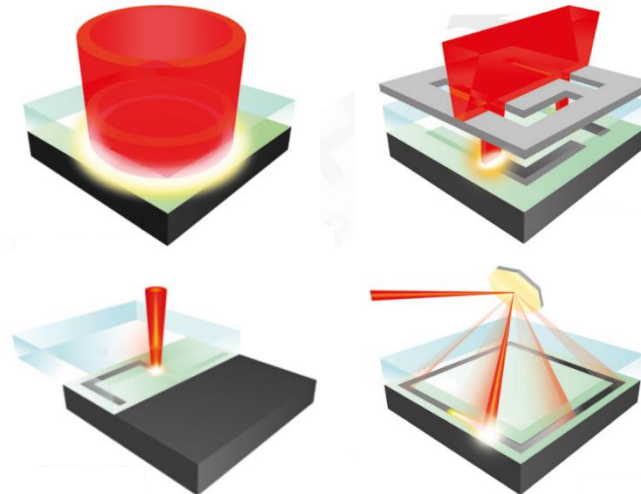
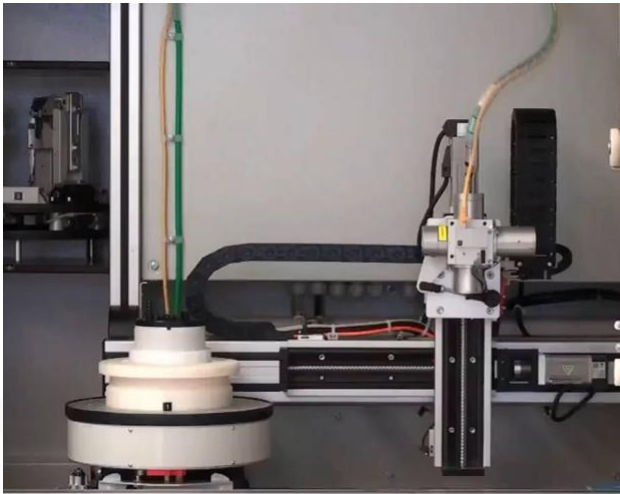
Applications – Imaging

- IR Illumination
- IR Imaging
- Machine Vision

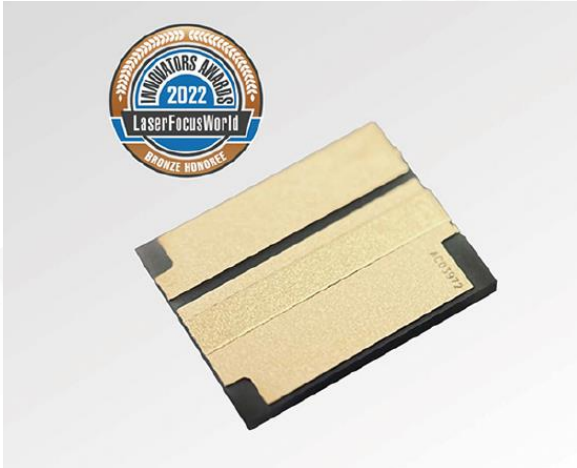


Applications – Welding

- Laser transmission welding of thermoplastics in the wavelength range 808nm-980nm
- Simultaneous welding of thermoplastics with Focuslight Line Beam Technology
- Cutting, welding and soldering of metals
- Metal surface finishing with Focuslight Line Beam Technology
- Corrosion- and abrasion-resistant hard metal coatings on steel

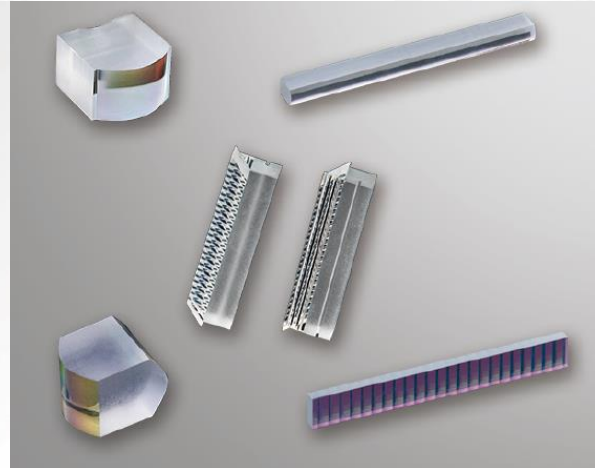


Applications – Blue Laser



AuSn Pre-Deposited Substrates

For optical cooling of the blue diode laser



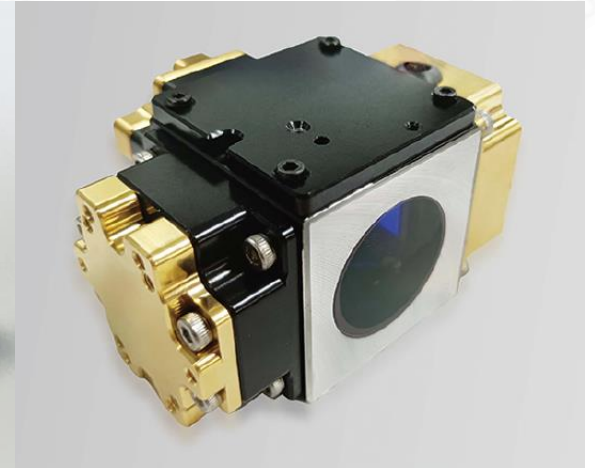
Beam-Shaping Optics

For highly efficient use of the photons



Laser Engraving Modules

With 20W output (typ.)
in 10 x 5 x 5 cm
dimensions



Lighting Modules

With 8,000 lm output
(typ.) in 7.5 x 6.5 x 4.5
cm dimensions

Applications – Display

- Several tens of beam shapers (plasma display pixel structuring)
- Several green 100 mm line beam systems (laser lift-off)
- > 600 mm UV line beam production system (laser lift-off)



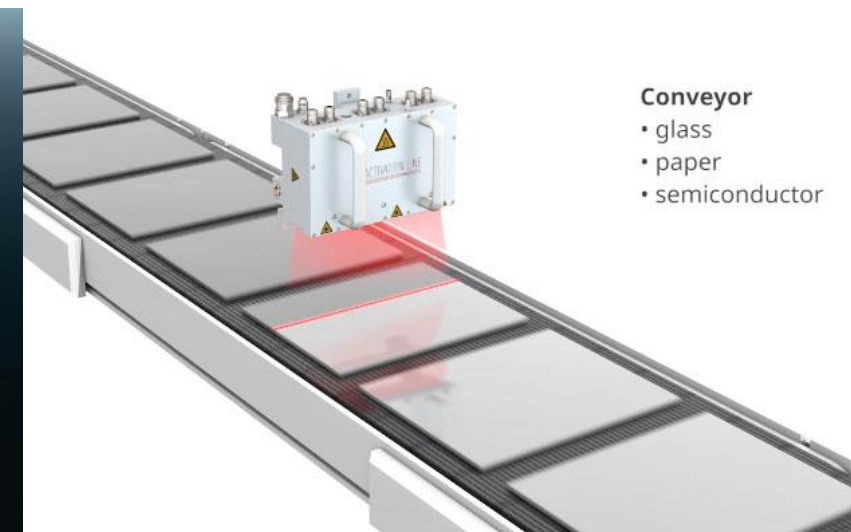
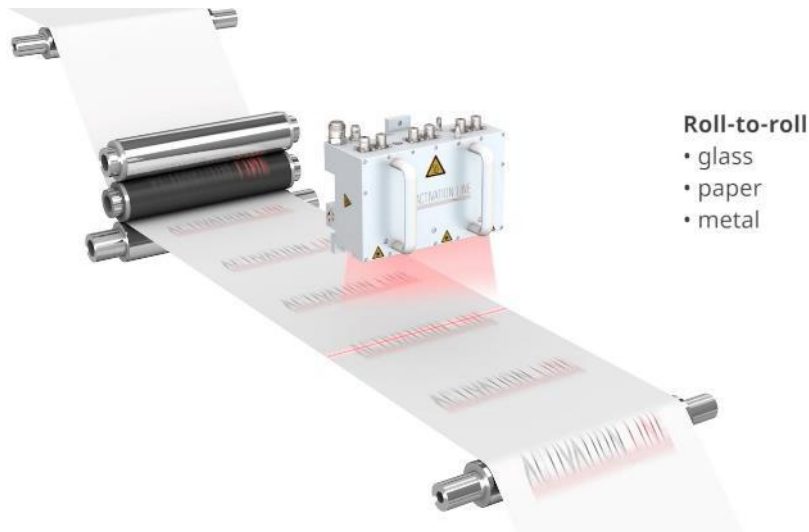
This graphic shows the laser lift off process.

Pre-production stage:

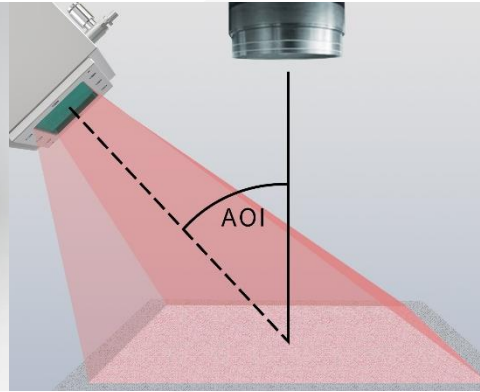
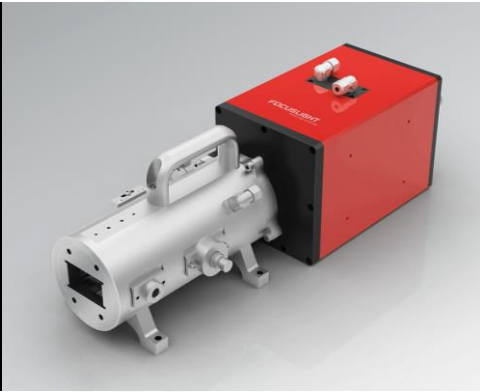
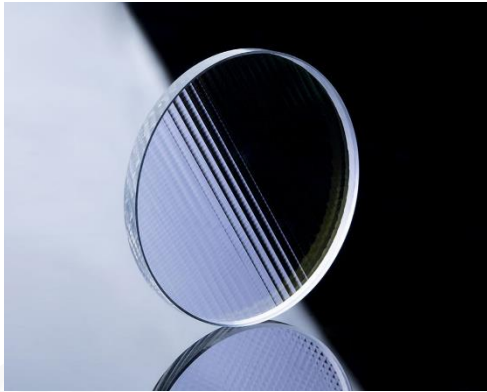
- Laser-induced thermal imaging process (LITI) with IR diode lasers
- Thermal optimization of TCO layers with Focuslight Line Beam Technology
- Low-temperature polysilicon annealing (LTPS) for AMOLED and high-resolution LCDs

Applications – Coating

- vRTP (very Rapid Thermal Processing) of functional coatings with Focuslight Line Beam Technology:
- Large-scale, energy-efficient and precisely controlled processing
- ... for a large variety of substrate materials (metal, glass, polymer, paper etc.)
- ... for a large variety of processes (annealing, crystallization, drying, sintering etc.)
- ... for a large variety of coating materials (semiconductors, metals, TCOs etc.)

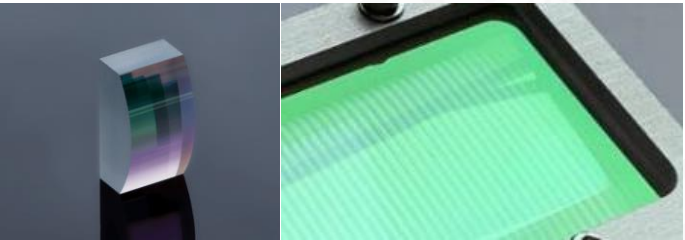
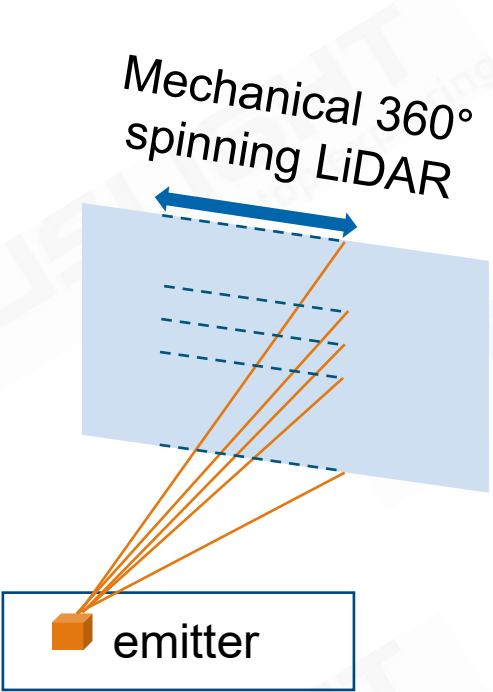


Application – Semiconductor

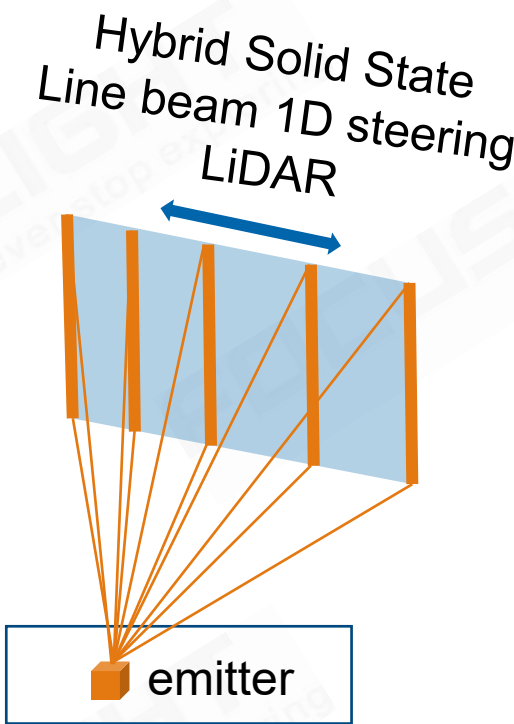


- Beam homogenization technology powers **lithography** illumination system – key optical component in steppers
- > 15 years supply to the major manufacturer of semiconductor lithography tools
- Laser system solutions with high power density and different beam profiles, designed for various **laser-based wafer annealing**, e.g. DSA, IGBT backside annealing, and SiC annealing
- Off-axis beam shaping technology powers laser surface treatment as well as surface inspection
- Typically used in **solar cell industry**
- Beam shaping on UV solid-state laser, 30000:1 aspect ratio is achievable
- Up to 1000 mm long UV Line generation system enabling **OLED laser lift-off** process
- Next-gen LTPS **solid-state laser annealing** process.
- Based on 976nm diode laser with adjustable beam output and >97% homogenization in energy distribution
- Ideal for **Mini / Micro LED manufacturing processing**, e.g. laser mass transfer, laser mass soldering, and laser chip repair

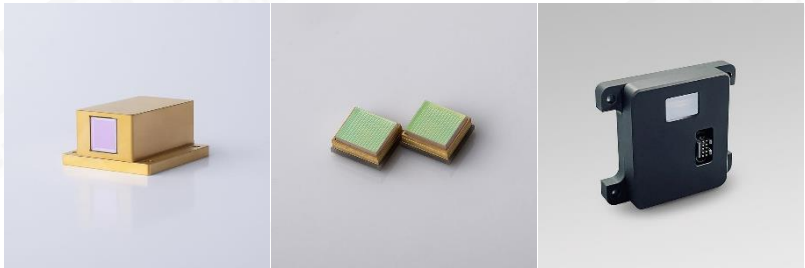
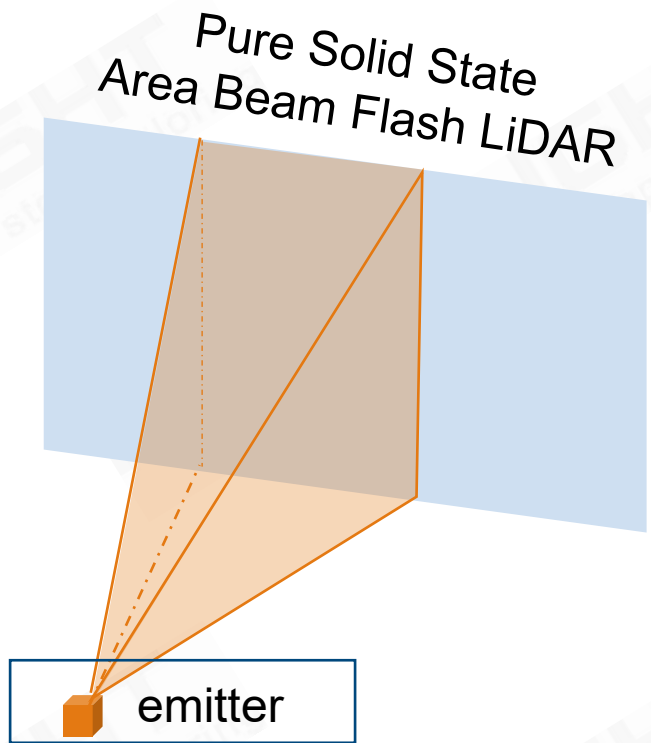
Application – Automotive LiDAR



Automotive-grade optics
and subassembly

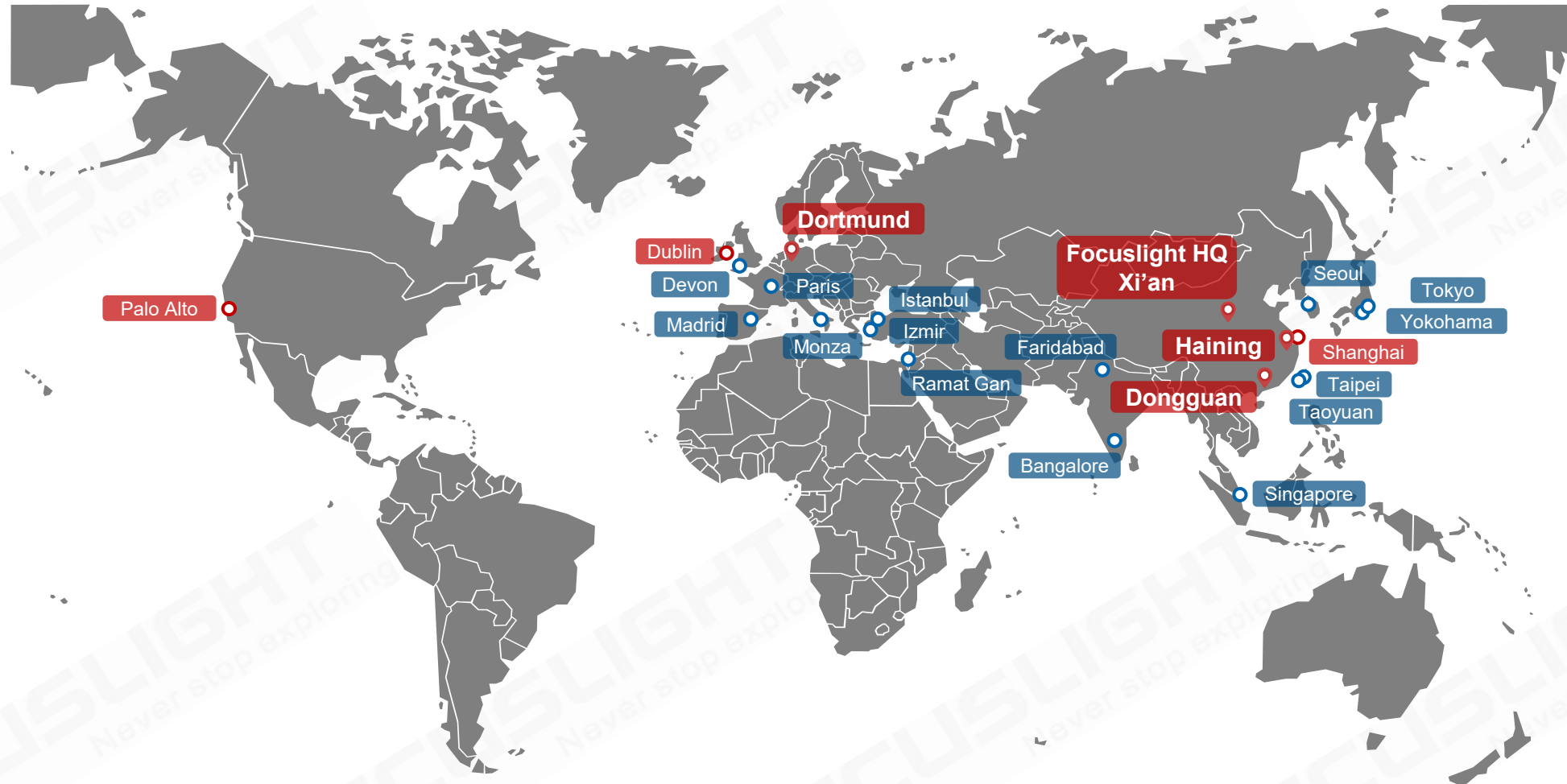


Line Beam Transmitter Modules



Flash Transmitter Modules

Sales Network



- Worldwide established distributors
- Direct sales offices in China, Ireland and US
- Manufacturing site in Xi'an, Dortmund, Dongguan and Haining

Summary



- Diode laser light source leader and beam shaping expert
- One stop source from active devices to passive optics, from components to modules to application subassemblies
- Total solution, versatile customization service and field service provider
- Strong RDE capability, high volume production capacity and low-cost manufacturing
- Strong IP position in diode lasers and laser optics
- Financially healthy and strong financial backing from investors for long term growth



- **Your committed and reliable long-term partner in diode lasers and laser optics**

[THANK YOU]



FOCUSLIGHT
Never stop exploring